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⑭ 発明の名称 画像ファイリング装置

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1. 発明の名称

画像ファイリング装置

2. 特許請求の範囲

読取った画像情報を記憶手段により記憶するとともに、対応する検索用キーワードを付して該画像情報を登録し、検索用キーワードに基づき目的の画像情報を検索して表示装置に表示するとともに、印刷手段により該画像情報をハードコピー化できるようにした画像ファイリング装置において、

検索表示回数を登録画像情報毎に積算する第1計数手段と、検索表示後の印刷回数を登録画像情報毎に積算する第2計数手段を備え、前記第1、第2計数手段によりそれぞれ積算された回数が予め定めた条件に合致する場合には、その旨を前記表示装置に表示させる表示制御手段を設けたことを特徴とする画像ファイリング装置。

3. 発明の詳細な説明

「産業上の利用分野」

本発明は、画像ファイリング装置に関するもので、登録された画像情報に対して検索表示回数及び検索表示後の印刷回数を、それぞれ積算して両者の積算値の関係が予め定めた条件に合致する場合には、その旨を表示するようにしたものである。

「従来の技術及び発明が解決しようとする課題」

画像ファイリング装置へ、画像情報を登録する場合には、その登録画像情報いわゆるファイルの管理体系を確立した状態でなされるのが望ましい。しかしながら現実には、とりあえずファイリングを進め、ある期間経過後又はある程度の分量がファイルされた後に、分類整理を行うことが多い。ファイルの登録後から分類整理までの期間の試行的運用状態を管理して、例えば検索表示回数と検索表示後の印刷回数をそれぞれ積算し、両者の関係から当該画像情報の重要度、保存廃棄の選別、キーワード選、不適等の画像ファイリング装置の管理運用のための重要な情報が得られる。また前記管理を続行することによって逐次提供される

情報に基づき、ファイル管理の更新等を行い画像ファイリング装置の効率的運用を図ることが期待される。

本発明は、前記した点に着目してなされたもので、登録された画像情報に対して検索表示回数及び検索表示後の印刷回数を、それぞれ積算して両者の積算値の関係が予め定めた条件に合致する場合には、その旨を表示するようにした画像ファイリング装置を提供することを目的とするものである。

#### 「課題を解決するための手段」

前記目的を達成するための具体的手段は、読取った画像情報を記憶手段により記憶するとともに、対応する検索用キーワードを付して該画像情報を登録し、検索用キーワードに基づき目的の画像情報を検索して表示装置に表示するとともに、印刷手段により該画像情報をハードコピー化できるようにした画像ファイリング装置において、検索表示回数を登録画像情報毎に積算する第1計数手段と、検索表示後の印刷回数を登録画像情報毎に積

算する第2計数手段を備え、前記第1、第2計数手段によりそれぞれ積算された回数が予め定めた条件に合致する場合には、その旨を前記表示装置に表示させる表示制御手段を設けたことを特徴とするものである。

#### 「作用」

本発明は、前記具体的手段の説明で明らかにしたように、登録画像情報毎に第1、第2計数手段によりそれぞれ検索表示回数、印刷回数を積算し、その各積算回数が予め定めた条件に合致する場合には、その旨を表示装置に表示してオペレータに提示する。

(以下余白)



#### 「実施例」

本発明の実施例を添付図面に基づいて説明する。

第1図は、電子ファイリングシステムの概略システム構成図であって、コントローラ1と、CRTディスプレイ装置2とを画像バスにより、画像読取装置であるイメージリーダ3、光ディスクデッキ4、ハードディスク装置5及びプリンター6とを画像バスとコマンドバスによりそれぞれ接続し、さらにイメージリーダ3用の自動原稿搬送装置7とキーボード8をコマンドバスにより接続する。

第2図は上記システムの内部ブロック図であって、システムバスにより、CPU10とROM11、RAM12、ハードディスクインターフェース(以下インターフェースをI/Fと云う)13、光ディスクI/F14、及びキーボードI/F15を接続するとともに、表示ブロック16、画像メモリ17、圧縮・伸張ブロック18とも接続する。さらに前記表示ブロック16、画像メモリ17及び圧縮・伸張ブロック18は、画像バスに

よりスキャナI/F19とプリンタI/F20とを接続する。前記CPU10は、ROM11に格納されたプログラムに従ってシステム全体の管理、制御を行う。その他画像情報の原稿上に指定された領域の抽出、文字認識等も行う。ハードディスクI/F13は、ハードディスクに記憶する画像情報の管理情報や入力されたキーワード等を転送する。光ディスクI/F14は、画像情報の登録時には圧縮・伸張ブロック18で符号化された画像情報を光ディスクに対して送り、画像情報の表示時には光ディスクから送られてくる符号化された画像情報を、前記圧縮・伸張ブロック18に転送する。キーボードI/F15は、キーボード8から入力される各種情報をCPU10に対して送る。さらに表示ブロック16では、表示用メモリを備え、画像メモリ17から圧縮・伸張ブロック18を介して転送された画像情報や、CPU10が直接寄込んだ情報等をCRTディスプレイ装置2に表示する。また画像メモリ17は、少なくとも1面の画像情報を記憶するメモリであって、ス

キャナ I/F 19 から伝送される画像情報を蓄え、るとともに、蓄えた画像データをプリンタ I/F 20、或いは圧縮・伸張ブロック 18 に伝送し、さらに圧縮・伸張ブロック 18 で伸張されて伝送される画像データを蓄える。その他にイメージリーダ 3 のスキャンによって読取られる指定領域内の画像情報を蓄える。また画像メモリ 17 に蓄えられる画像情報は、CPU 10 の指令により直接リードライトされたり、前記ハードディスク I/F 13、光ディスク I/F 14、圧縮・伸張ブロック 18 との間で画像情報の伝送を行う。画像メモリ 17 は、前記ブロック図に示すように画像バス及びシステムバスのどちらからでもアクセスが可能である。圧縮・伸張ブロック 18 は、画像情報を符号化する圧縮部と符号化された画像情報を元の画像情報に戻す伸張部とから構成され、画像メモリ 17 から画像バスを介して送られる画像情報を符号化して光ディスク I/F 14 に伝送し、光ディスク I/F 14 からシステムバスを介して送られてくる符号化した画像情報を復号し、画像

バスを介して画像メモリ 17 に伝送する。その他、スキャナ I/F は、スキャナから送られる画像情報又は前記指定領域内の画像情報を、画像メモリ 17 に伝送し、プリンタ I/F 20 は、画像メモリ 17 或いは表示ブロック 16 の表示メモリに蓄えられた表示画像情報をプリンタ 6 に伝送するとともに、該プリンタ 6 により画像情報をハードコピー化する。

続いて、この電子ファイリングシステムの処理動作について各フローチャート及びその処理動作開始時の CRT ディスプレイ装置 2 の画面を付して説明する。

第 3 図(a)は、本実施例のメインルーチンを示すフローチャートである。また同図(b)は本ルーチン開始時の画面表示である。

(ステップ S11、以下ステップを略す)では、電源投入後各種動作に必要な条件の初期設定を行い、続いて(S12)でキーボード 8 から入力されるコマンドの種類により、登録作業ルーチン(S13)、検索作業ルーチン(S14)、又はユーテ

ィリティ作業ルーチン(S15)をコールする。

第 4 図は、登録作業ルーチンを示すフローチャートである。

まず、(S21)では、画像入力処理ルーチンが実行される。

次に(S22)では、読取った記憶した画像情報を後に検索するためのキーワードを付加するキーワード登録入力処理ルーチンが実行される。

(S23)の画像書き込み処理ルーチンでは、読取装置で読取り、画像メモリ 17 に蓄えられた画像情報を、符号化して光ディスクに書き込む処理が実行される。

続く(S24)では、キーワード及び管理情報書き込み処理ルーチンが実行され、入力されたキーワード及び画像の管理情報(光ディスク上の記憶位置、記憶容量等)をハードディスクに書き込む。

(S25)に進んで、読取るべき次の原稿の有無をオペレータに問い、有れば前記登録作業ルーチンを繰り返す。無ければ登録作業ルーチンを終了する。

第 5 図(a)は、前記画像入力処理ルーチンを示すフローチャート、同図(b)は本処理ルーチン開始時の CRT ディスプレイ装置 2 の画面表示である。

この画像入力処理ルーチンは、第 5 図(b)に示す CRT ディスプレイ装置 2 上の各メッセージを見てキーボード入力されるオペレータの指示(S31)により、逐次実行されるものである。

まず、電子ファイリングシステムに記憶させて登録するための画像情報の原稿を画像読取装置であるイメージリーダ 3 用の自動原稿搬送装置 7 若しくは直接イメージリーダ 3 の原稿ガラス台上にセットする。自動原稿搬送装置 7 にセットされた原稿は、読取り開始の指示により順次自動的に原稿ガラス台上に送り込まれる。そして、(S32)で解像度モード変更の有無を調べ(S31)で入力された内容が解像度モード変更であれば現行の解像度モードから、高解像度モード(400dpi)又は普通解像度モード(200dpi)に変更(S33)し、再びキーボード入力(S31)へ戻る。解像度

モードを変更しない場合(S32でNO)は、(S34)で読取り開始かどうかを調べ、(S31)で入力された内容が読取り開始の指示でなければ、他のパラメータ処理(S35)を行う。他のパラメータ処理としては、同図(b)に示される読取りサイズ、露光レベル、中間調の有無、倍率等の決定等を行う。オペレータから読取り開始の指示がキーボードから入力される(S34でYES)と、イメージリーダ3のスキヤナのスキヤン動作により原稿ガラス台上の原稿画像を、光電変換素子上に結像させデジタル信号化して画像情報として画像メモリ17に蓄える。主走査方向には光電変換素子の電気的走査により、副走査方向にはスキヤナの移動により走査する(S36)。画像メモリ17に蓄えられた読取画像情報は、CRTディスプレイ装置の解像度によっては所定の縮率により同引いて、或は同引かずそのまま表示部16の表示用メモリへ転送して、CRTディスプレイ装置2の画面に表示し(S37)、本ルーチンを終了する。画像情報を同引くのは、画像情報読取装置3とC

RTディスプレイ装置2の解像度の違いから全体画像を表示するためである。

第6図(a)は、キーワード登録入力処理ルーチンを示すフローチャート、同図(b)は本処理ルーチン開始時のCRTディスプレイ装置2の画面表示である。

まず、(S41)では、読取る画像情報の中で特徴的な部分の画像情報を、領域指定により抽出して該画像情報とは別個に検索補助情報(以下画像キーワードと云う)として登録するか否かのフラグを「0」にリセットし、続いて(S42)で画像情報を保存する期間を登録された画像情報毎に、指定するための画像情報保存フラグを「0」にリセットする。以下の各ステップは、キーボードからのオペレータの指示入力により行われる(S43)。前記画像キーワードとしては、登録する画像情報を特徴的に表示する図面、グラフ、表等の絵情報が適するが、簡単な記号等の文字情報であってもよい。

(S44)では、キーワード入力作業終了か否か

を問い、終了であれば本処理ルーチンを終了する。終了でなければ、(S45)に進んで(S43)で入力された内容が、画像キーワード登録か否かを判定し、NOであれば(S46)で更に画像情報を保存するか否かを問い、保存しなければ通常のキーワード登録入力処理(S47)を行い、(S43)のキーボード入力に戻る。保存する場合は(S48)に進み、オペレータレベルが適切か否かを判定する。オペレータレベルとは、画像情報の保存登録に際しての適切な判断能力及び経験等の有無の判定基準をいうものであって、オペレータの所属部署、役職等により判定する。オペレータレベルが適切であると判定されると(S48でYES)、後述する保存処理のサブルーチンをコール(S49)して、保存処理を行い前記(S43)へ戻る。

前記(S45)の画像キーワード登録を行う場合は、(S50)へ進み画像キーワード登録フラグを「1」にセットし、後述する画像キーワードエリア設定処理のサブルーチンをコール(S51)し、エリア設定を行い(S43)のキーボード入力へ戻る。

第7図(a)は、前記保存処理ルーチン(S49)を示すフローチャート、同図(b)は保存期間を入力した場合のCRTディスプレイ装置2の表示画面である。

保存処理ルーチンは、(S61)で画像情報保存フラグを「1」にセットし、オペレータから保存期間を入力(S62)して本ルーチンを終了する。

第8図(a)は、前記画像キーワードエリア設定処理ルーチンを示すフローチャート、同図(b)は登録エリア設定を促すCRTディスプレイ装置2の表示画面である。

(S71)では、CRTディスプレイ装置2の画面から現在表示されているキーワード入力指示画面を退避させ、画像メモリ17から表示用メモリへ転送された登録すべき読取画像情報を表示する(S72)。続いて(S73)で、画像キーワードのエリア設定の開始座標IKXS、IKYSを「0」にセットし、(S74)では画像キーワードの長さ情報IKXL、IKYLを初期設定する。前記IKXS、IKYS、IKXL、IKYLに基

づいて現在どの範囲がエリア設定されているかを、CRTディスプレイ装置2の画面で枠表示する(S75)。以下の各ステップはキーボードからのオペレータの指示入力により行う(S76)。移動キー操作が行われる(S77でYES)と、IKXS又はIKYSを増加又は減少方向に更新して枠表示を移動し(S78)、大きさキーが操作される(S79でYES)と、IKXL又はIKYLを増加又は減少方向に更新して枠表示の大きさを変更する(S80)。終了キーが操作される(S81でYES)と、キーワード入力指示画面(第6図(b))を復帰させて(S82)、本処理ルーチンを終了する。前記各キー操作後(S77、S79でYES、S81でNO)は、(S75)に戻って次のキーボードからの入力指示を待つ。

第9図は、画像書き込処理ルーチンを示すフローチャートである。

(S91)で、画像メモリ17に蓄えられた画像情報を圧縮・伸張ブロック18に転送して符号化を行い、光ディスクへの書き込み開始アドレスを算出

情報を、通常解像度モードであれば(S103でNO)そのまま、高解像度モードであれば(S103でYES)、前記画像情報を間引いて光ディスクへ転送して画素密度を一定にして書き込み画像キーワードとする(それぞれS104、S105)。

光ディスクへの画像キーワードの書き込みは、画像情報とは別個の位置、即ち、別の頁、あるいは別ファイル位置に行われる。また、画像キーワードはデータ圧縮を行わずに光ディスクへ記憶される。これは、画像キーワードの表示エリア自体が小さく、メモリ量がそれ程大きくならないためであり、これによって、表示の際に伸張する必要がなくなり短時間で処理可能となる。

前記通常解像度モードの場合であっても、画像情報を間引いて転送して画素密度を落とすこともできる。

続いて、光ディスクに書き込まれた画像キーワードの書き込み最終アドレスを、画像キーワードの管理情報とするため取出す(S106)。続く(S107)で、表示印刷カウント値をクリアし、(S1

08)でハードディスクへ管理情報を書き込むための書き込み開始アドレスを算出し、(S109)に進みハードディスクへ管理情報を転送する。

前記管理情報としては、画像キーワード登録フラグ、画像キーワードの開始及び終了トラック、画像キーワードのX及びY長さ、画像開始及び終了トラック、画素密度、その他保存期間、登録日時、キーワード等第11図に示されたものがある。

第10図は、キーワード及び管理情報書き込処理ルーチンを示すフローチャートである。

(S101)では、画像キーワード登録フラグが「1」にセットされているか否かが判定され、セットされていない場合は後述する(S107)へジャンプし、セットされていれば光ディスクへの書き込み開始アドレスを算出し(S102)、続いて解像度モードが高解像度モードであるか否かを判定し(S103)、前記画像キーワードエリア設定処理ルーチン(第8図(a))に於いて、IKXS、IKYS、IKXL、IKYLにより表示画面上で設定されたエリアに相等する画像メモリ17上の画像

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第12図(a)は、電子ファイリングシステムの検索作業ルーチンを示すフローチャート、第12図(b)は本ルーチン開始時のCRTディスプレイ装置2の画面表示である。

(S111)で、オペレータが検索用のキーワードを、キーボード8により入力する。続いて(S112)で検索終了の指示の有無を判断し、指示があればこの検索作業ルーチンを終了し、無ければ(S113)へ進み入力された検索用のキーワードに基づき、ハードディスクに蓄えられている管理情報テーブル(第11図参照)を読み出して検索を行い、検索の結果該当する文書が見つからない

場合(S114でNO)は、キーワード入力へ戻り、該当文書が検索された場合(S114でYES)は、後述する該当文書リスト表示処理のサブルーチンをコールし(S115)、その文書リストをCRTディスプレイ装置2に表示する。オペレータは、その文書リストの中から光ディスクから読み出す文書を選択し(S116)、続いて検索終了かどうかを判定し検索作業を継続する場合(S117でNO)は、前記キーワード入力(S111)へ戻り、検索終了の場合(S117でYES)は、光ディスクから管理情報に基づき該当画像情報を読み出し、圧縮・伸張ブロック18で復号し画像メモリ17へ伝送し(S118)、CRTディスプレイ装置2に表示する(S119)(第12図(c))。(S120)では、表示した文書(画像情報)に対してカウント処理し、カウント後管理情報としてハードディスクへ書き込む。表示された画像情報を印刷してハードコピー化したい場合は、キーボードからの入力(S121)が印刷指示であるかどうか(S122)で判定され、印刷である場合には、当該文

書に対してカウント処理し、カウント後管理情報としてハードディスクへ書き込み(S123)、画像メモリ17上の画像情報をプリンタ6に転送して、プリントアウトする(S124)。

第13図(a)は、該当文書リスト表示処理ルーチンのフローチャート、同図(b)はCRTディスプレイ装置に表示された文書リスト表示例である。

まず、(S131)でCRTディスプレイ装置2の表示画面上での表示位置を決定するための、表示アドレスを算出する。続く(S132)で検索文書表示終了か否かを判定し、終了していれば本ルーチンを終了し、検索されて表示していない文書が残っている場合は(S133)へ進み、表示画面上に表示エリアが残っているか否かを判定する。表示エリアが無い場合には、本ルーチンを終了する。表示エリアが残っている場合には、検索該当文書のキーワードを表示し(S134)、続く(S135)で画像キーワード登録フラグが「1」にセットされているか否かを判定する。該フラグが「1」にセットされていない場合(S135でNO)

は、前記(S132)へ戻り、セットされている場合は、管理情報に基づき光ディスクから画像キーワードの画像情報を読み出し、表示用メモリへ転送して表示する(S136)(第13図(b))。続いて(S137)では、1件分の表示がなされたので、次の表示に備えて表示アドレスを更新し(S132)へ戻る。

第14図は、ユーティリティ作業ルーチンを示すフローチャートである。

本作業は、オペレータのキーボード入力による指示により(S141)、それぞれ更新処理ルーチン(S142)、一括更新処理ルーチン(S143)、その他の処理ルーチン(S144)が実行される。

第15図(a)は、前記更新処理ルーチンを示すフローチャート、同図(b)は本処理ルーチンに於けるCRTディスプレイ装置2の画面表示の一例を示すものである。

(S151)で、記憶登録した画像情報であるファイルの管理情報をハードディスクから取出し、続いて(S152)でファイルの終了が判定される

と表示をしないで(S160)のキーボード入力処理へ進む。ファイルの終了でない場合は、(S153)でファイルのキーワードを表示し、保存フラグが「1」にセットされているか否かを判定し(S154)、保存指定がなされている場合は、登録後保存日時経過したか否かを判定する(S155)。前記(S154)で保存フラグが「1」にセットされていない場合は、登録後所定日時経過したか否かを判定する(S156)。前記(S155)及び(S156)の各ステップで、いずれも日時経過と判定された場合は、それぞれ登録からの期間及び日時経過表示をCRTディスプレイ装置2の画面に表示する(S157)。保存又は所定の日時が経過していない場合は、(S158)へ進み表示と印刷の回数が適切か否かを判定する。例えば、管理情報としてハードディスクに書込まれた表示カウント値と印刷カウント値を比較し、

表示カウント値>印刷カウント値×2であれば、検索されてCRTディスプレイ装置2の画面に表示された文書が目的の文書でなかった

場合が多いため、印刷された回数が表示回数よりも極端に少ないことを示し、検索のためのキーワードが不適切であると判定し、その旨を表示する(S159)。

続く(S160)以下の各ステップは、キーボード入力によるオペレータの指示によりなされる。

(S161)で本ルーチンを終了するか否かを、(S162)で次文書について本ルーチンの更新処理を行うか否かを、(S163)では削除処理を行うか否かを、(S164)ではキーワードを変更するか否かを、それぞれオペレータに問い該当の処理を促す。次文書について更新処理を行う場合は、(S151)へ戻り、削除処理を行う場合には(S166)へ進み、キーワード変更処理を行う場合には(S165)へそれぞれ進み、処理後は(S160)へ戻る。

第16図は、一括更新処理ルーチンを示すフローチャートである。

(S171)では、ファイルの管理情報をハードディスクより取出し、続いて(S172)でファイ

ルの終了が判定されると本ルーチンを終了し、終了でない場合は(S173)で保存フラグが「1」にセットされているか否かを判定し、セットされていれば登録後保存日時経過したか否かを、セットされていない場合は登録後所定日時経過したか否かをそれぞれ(S174)、(S175)で判定し、経過している場合には削除処理(S176)を行う。

削除処理は、登録後の日時が所定以上経過したファイルについて削除を行うものであるが、光ディスクは書き込みオンリであるため、ハードディスクに書込んだ当該ファイルの管理情報を消去してアクセス不能にすることにより行うが、削除するか否かの選択手段を設けたり、或いは所定期間経過したものは自動的に削除処理できるようにして、文書廃棄作業の効率化を図ることもできる。

なお、前記実施例では、画像データをデータ圧縮することなくそのまま画像キーワードとして光ディスクメモリへ記憶させているが、画像キーワードは圧縮・伸張して処理してもよい。

#### 「発明の効果」

本発明は、前記した具体的手段及び作用の説明で明らかにしたように、登録画像情報毎に第1、第2計数手段によりそれぞれ検索表示回数、印刷回数を積算し、その各積算回数が予め定めた条件に合致する場合には、その旨を表示装置に表示するようにしたから、両者の回数の関係を解析して種々の条件を設定することにより、当該画像情報の重要度、保存廃棄の選別、キーワード適、不適等の画像ファイリング装置の管理運用のための重要な情報が得られ、その情報に基づき、ファイル管理の更新等を行い画像ファイリング装置の効率的運用を図ることができる。

特に、検索用のキーワードが適切であれば、検索表示回数と印刷回数にそれほどの差はないはずであるから、両者の回数を比較することにより前記キーワードの適、不適を直接的に判断でき、適切なキーワードに変更することにより検索効率を高めることができる等の効果がある。

#### 4. 図面の簡単な説明

添付図面は、本発明の実施例を例示し第1図は電子ファイリングシステムの概略システム図、第2図は同内部ブロック図、第3図(a)はメインルーチンの、第4図は登録作業ルーチンの、第5図(a)は画像入力処理ルーチンの、第6図(a)はキーワード登録入力処理ルーチンの、第7図(a)は保存処理ルーチンの、第8図(a)は画像キーワードエリア設定処理ルーチンの、第9図は画像書込処理ルーチンの、第10図はキーワード及び管理情報書込処理ルーチンのフローチャートをそれぞれ示し、第11図は管理情報を例示した説明図、第12図(a)は検索作業ルーチンの、第13図(a)は該当文書リスト表示処理ルーチンの、第14図はユーティリティ作業ルーチンの、第15図(a)は更新処理ルーチンの、第16図は一括更新処理ルーチンのフローチャートをそれぞれ示す。また、第3図(b)、第5図(b)、第6図(b)、第7図(b)、第8図(b)、第12図(b)、同図(c)、第13図(b)、第15図(b)はそれぞれ該当ルー

チン実行時のCRTディスプレイ装置2の画面表示を例示した説明図である。

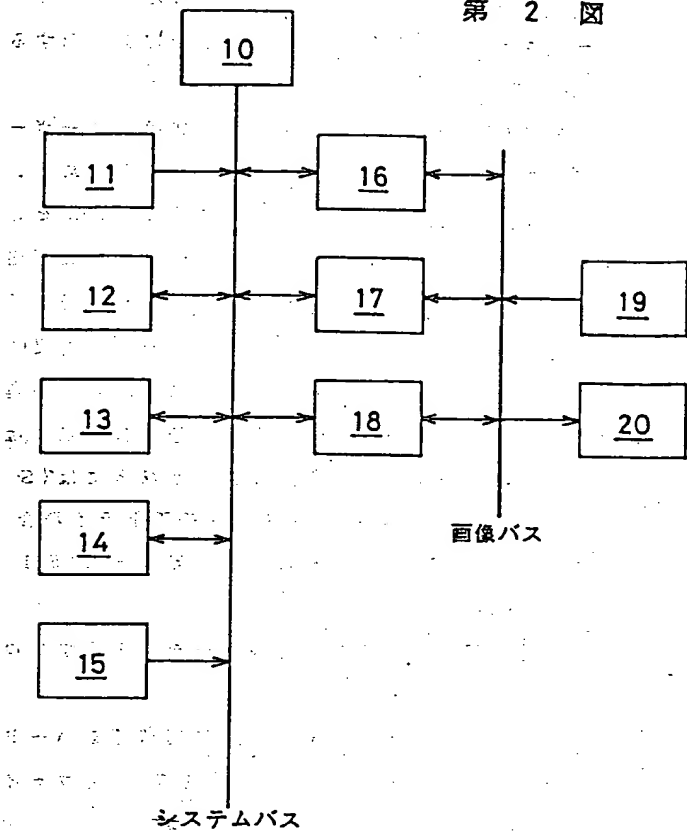
1...コントローラ、2...CRTディスプレイ装置、3...イメージリーダー、4...光学ディスクデッキ、5...ハードディスク装置、6...10...CPU、16...表示ブロック、17...画像メモリ、18...圧縮・伸張ブロック。

特許出願人 ミノルタカメラ株式会社

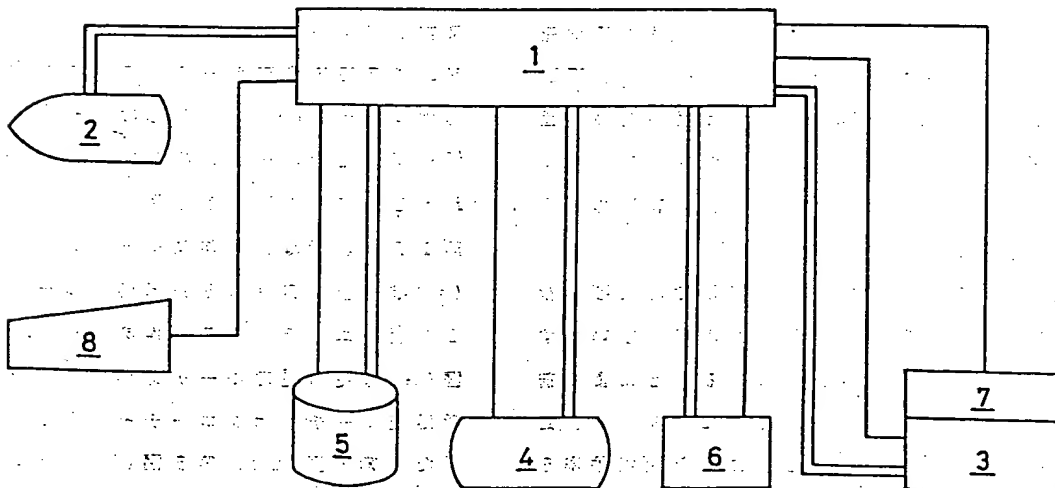
代理人 弁理士 後 藤 勇 作



第 2 図



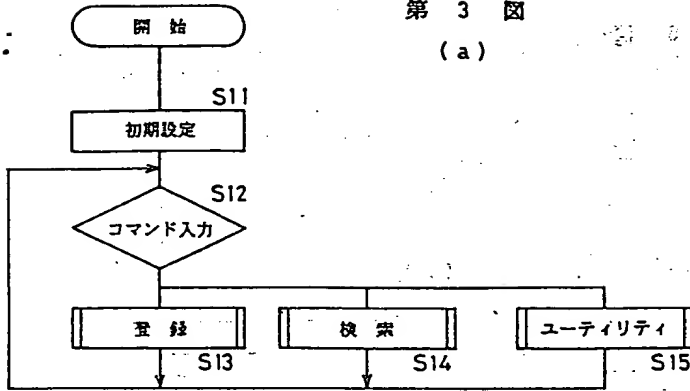
第 1 図



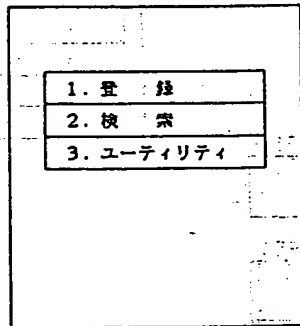


第 3 図

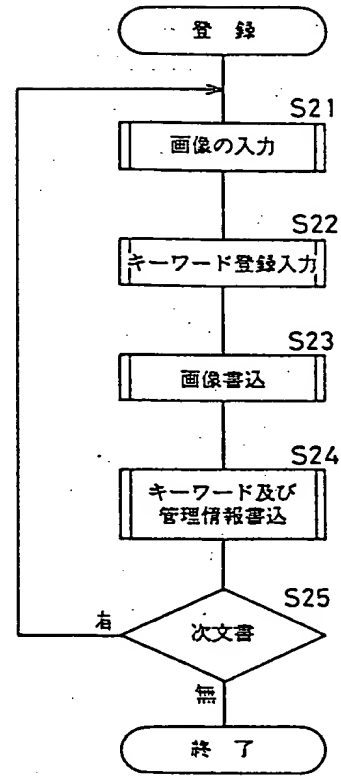
(a)



(b)

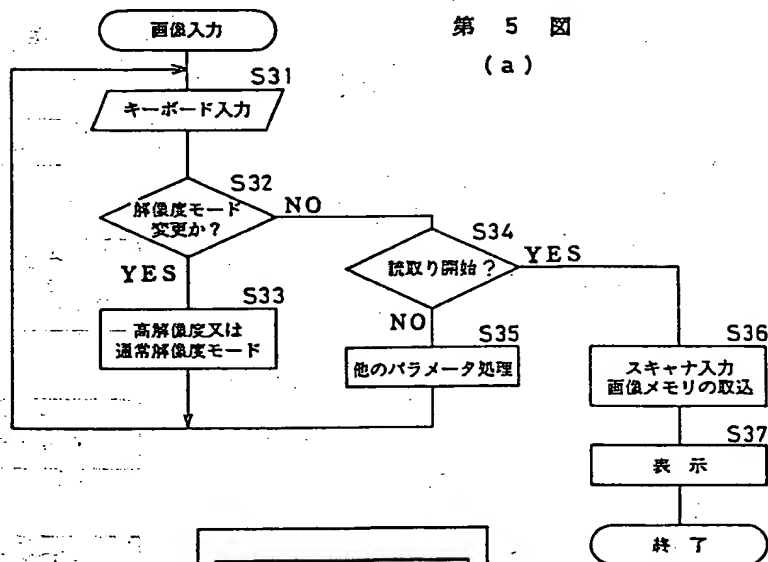


第 4 図

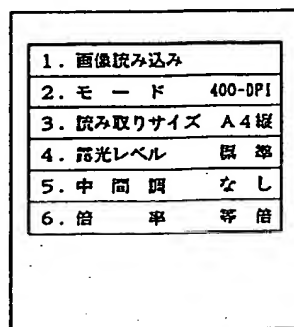


第 5 図

(a)

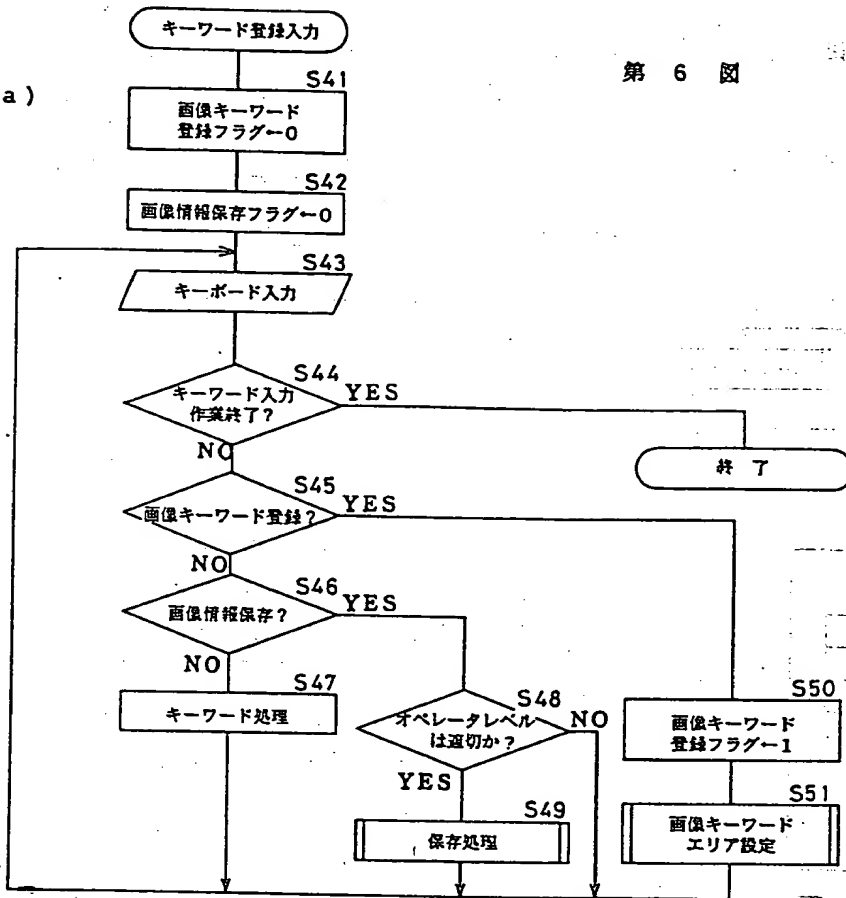


(b)



第 6 図

(a)

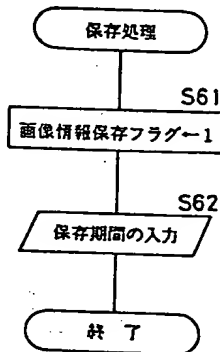


(b)

画像キーワード登録	
保 存	
キーワード1	
" 2	
" 3	
" 4	
" 5	
終 了	

第 7 図

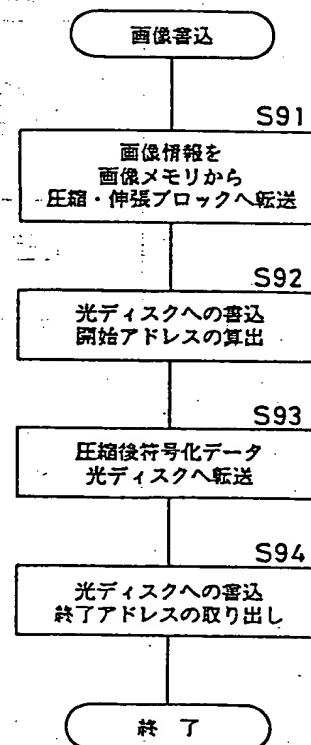
(a)



(b)

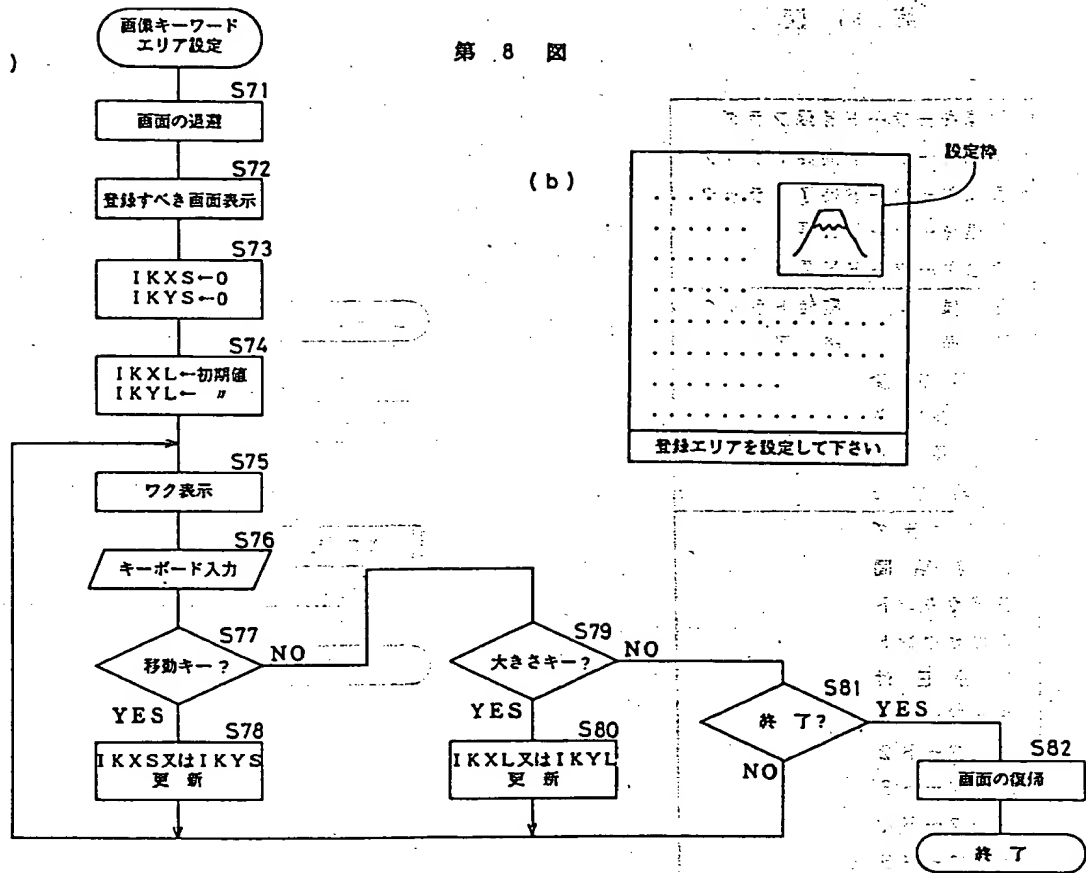
画像キーワード登録	
保存期間は2年0ヶ月	
キーワード1	
" 2	
" 3	
" 4	
" 5	
終 了	

第 9 図

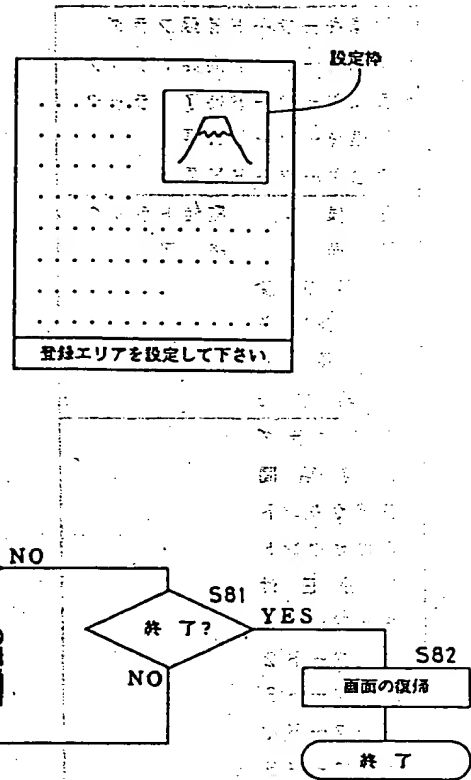


第 8 図

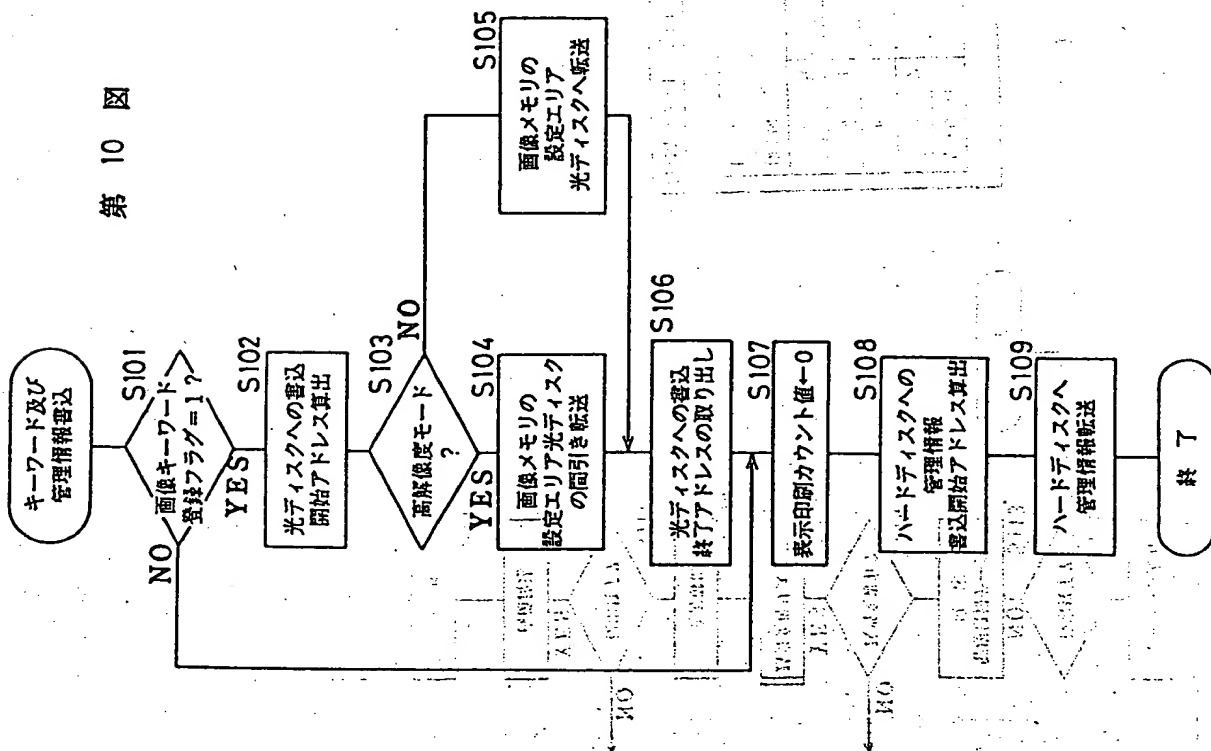
(a)



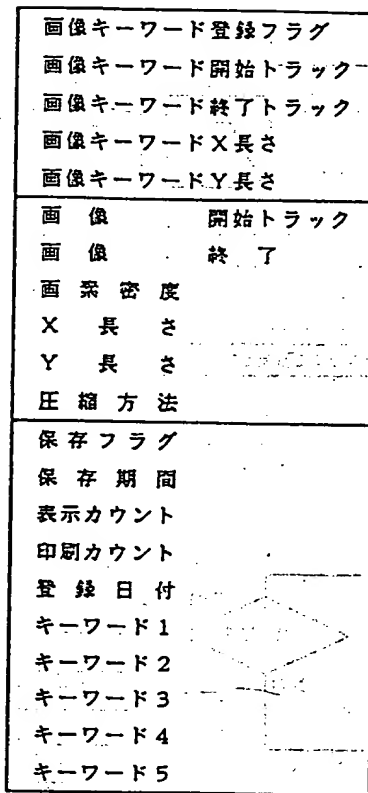
(b)



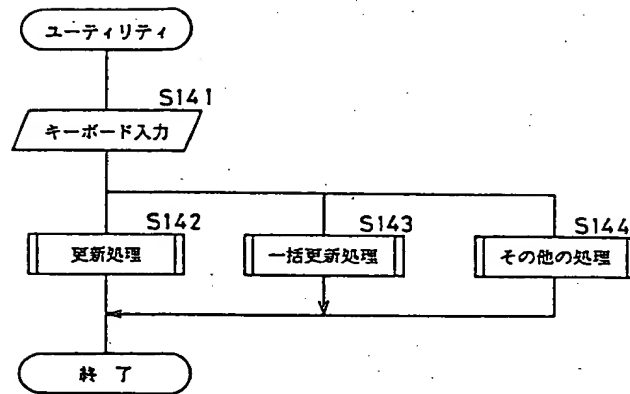
第 10 図



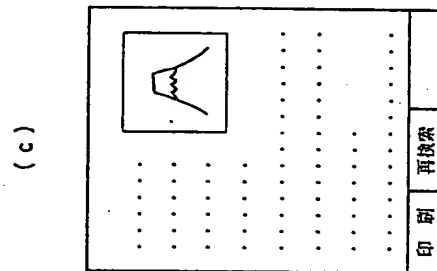
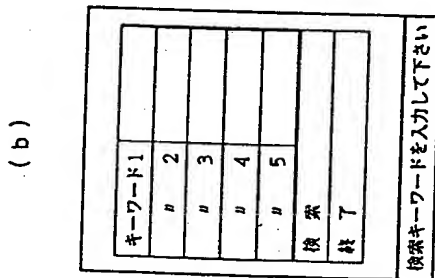
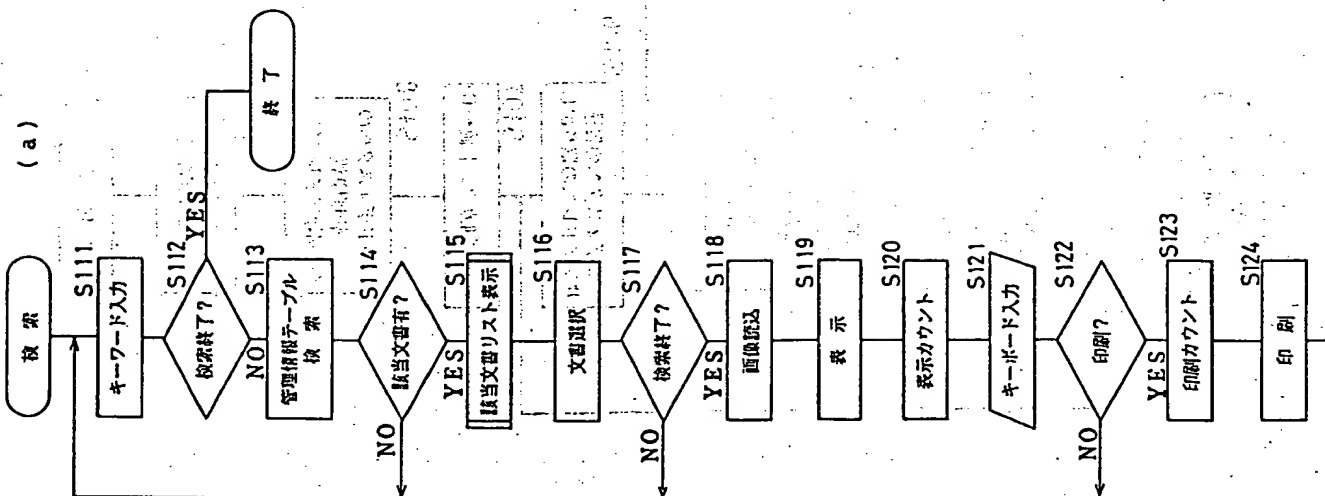
第 11 回



第 14 圖

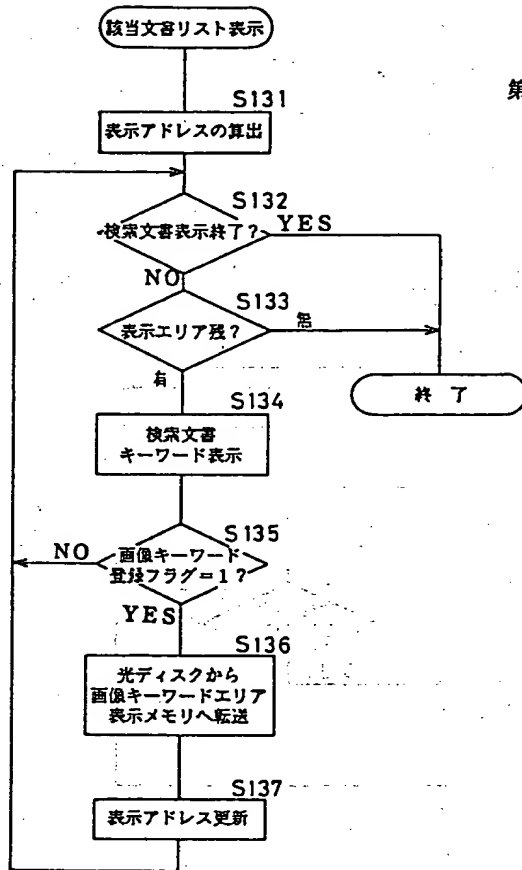


第 12 圖

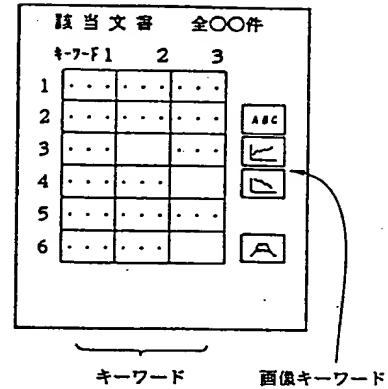


第 13 図

(a)

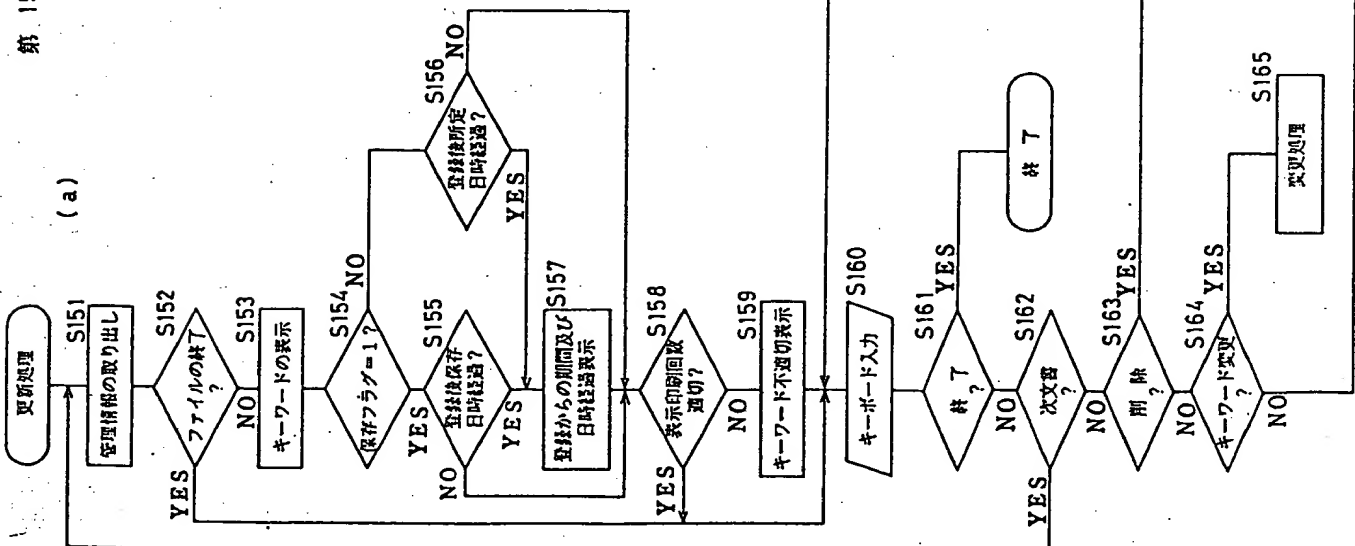


(b)

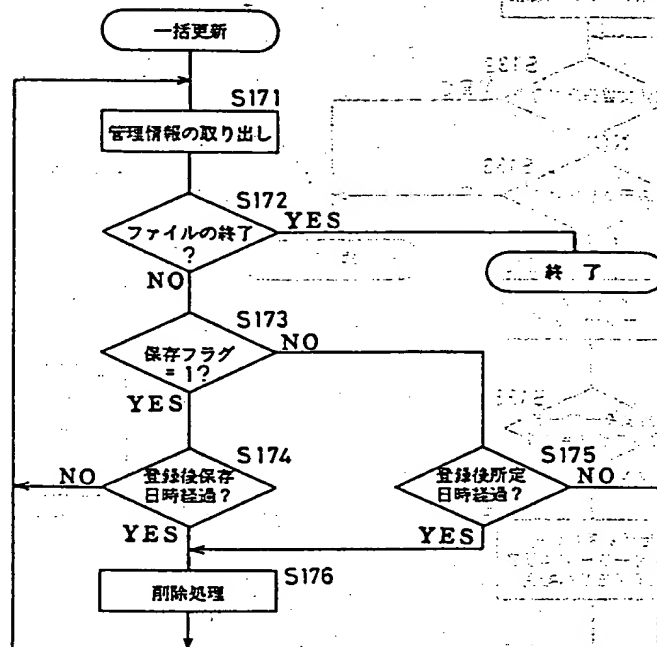


第 15 図

(a)



第 16 図



~~identification data is on display. In accordance with the third outstanding aspect of the present invention as above described, the auxiliary document identification data is reduced in the amount of data but is not processed for compression of data which would otherwise require an unnecessarily large amount of time.~~

#### BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of an image filing system according to the present invention will be more clearly appreciated from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a diagram showing a representative example of the hardware architecture of an image filing system to which the present invention generally appertains;

Fig. 2 is a block diagram schematically showing the general internal block configuration of the controller incorporated in the image filing system illustrated in Fig. 1;

Fig. 3 is a flowchart showing a main routine program to be executed by the central processing unit which forms part of the controller illustrated in Fig. 2;

Fig. 4 is a plan view showing a menu of selectable items which are to be displayed on the screen of the display unit of the system at the start of the main routine program illustrated in Fig. 4;

Fig. 5 is a view showing the details of a data storage

subroutine program included in the main routine program illustrated in Fig. 3;

Fig. 6 is a flowchart showing the details of an image data input control subroutine program included in the image data storage routine program illustrated in Fig. 5;

Fig. 7 is a plan view showing a menu of selectable items which are to be on display during execution of the image data input control subroutine program illustrated in Fig. 6;

Figs. 8A and 8B are flowcharts showing the details of a keyword input control subroutine program also included in the image data storage routine program illustrated in Fig. 5;

Figs. 8C and 8D are flowcharts showing an alternative example of the keyword input control subroutine program illustrated in Figs. 8A and 8B;

Fig. 9 is a plan view showing a menu of selectable items which are to be on display at the start of the keyword input control subroutine program illustrated in Figs. 8A and 8B;

Fig. 10 is a flowchart showing details of an image data saving period data storage subroutine program included in the keyword input control subroutine program illustrated in Figs. 8A and 8B;

Fig. 11 is a plan view showing a menu of selectable items which are to be on display at the start of the image data saving period data storage subroutine program illustrated in Fig. 10;

Figs. 12A and 12B are flowcharts showing details of an

image keyword area defining subroutine program included in the keyword input control subroutine program illustrated in Figs. 8A and 8B;

Fig. 13 is a plan view showing a frame of image which may be on display at the start of the image keyword area defining subroutine program illustrated in Figs. 12A and 12B;

Fig. 14 is a flowchart showing the details of an image data write control subroutine program also included in the image data storage routine program illustrated in Fig. 5;

Fig. 15 is a flowchart showing the details of a key-word/control data write control subroutine program further included in the image data storage routine program illustrated in Fig. 5;

Figs. 16A and 16B are flowcharts showing the details of a data search subroutine program also included in the main routine program illustrated in Fig. 3;

Fig. 17A is a plan view showing a menu of selectable items which are to be displayed on the screen of the display unit of the system at the start of the data search subroutine program illustrated in Figs. 16A and 16B;

Fig. 17B is a plan view showing a frame of image which may be on display during execution of the data search subroutine program illustrated in Figs. 16A and 16B;

Fig. 18 is a flowchart showing the details of a document list display subroutine program included in the data search subroutine program illustrated in Figs. 16A and 16B;

Fig. 19 is plan view showing a frame of image indicating the main keywords and auxiliary or image keywords associated with the documents listed on the display unit of the system during execution of the document list display subroutine program illustrated in Fig. 18;

Fig. 20 is a flowchart showing the details of a utility subroutine program further included in the main routine program illustrated in Fig. 3;

Figs. 21A and 21B are flowcharts showing the details of a file renewal subroutine program included in the utility subroutine program illustrated in Fig. 20;

Fig. 22 is a plan view showing a menu of selectable items which are to be displayed on the display unit of the system at the start of the file renewal subroutine program illustrated in Figs. 21A and 21B; and

Fig. 23 is a flowchart showing the details of a batch renewal subroutine program also included in the utility subroutine program illustrated in Fig. 20.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Description will be hereinafter made with reference to the drawings in regard to a preferred embodiment of an image filing system according to the present invention.

Referring first to Fig. 1, an image filing system to which the present invention generally appertains includes a controller 20 connected to a display unit 22 through an image data bus 24. The display unit 22 is typically of the cathode



ray tube (CRT) type. The controller 20 is further connected to an image reader 26 through an image data bus 28 and a command bus 30, an optical disk deck 32 through an image data bus 34 and a command bus 36, a hard disk drive unit 38 through an image data bus 40 and a command bus 42, a printer 44 through an image data bus 46 and a command bus 48. Further connected to the controller 20 are an automatic document feeder 50 through a command bus 52 and a keyboard 54 through a command bus 56 as shown. The automatic document feeder 50 is provided in association with the image reader 26 and is used to feed a document to be optically scanned by the image reader 26 to generate image data representing the image borne on the document fed by the automatic document feeder 50.

In Fig. 2 is schematically shown the general internal block configuration of the controller 20 which forms part of such an image filing system. As shown, the controller 20 comprises a central processing unit 60 connected through a system bus to a read-only memory 62 (ROM), a random-access memory 64 (RAM), a hard disk interface circuit 66 (HD I/F), an optical disk interface circuit 68 (OD I/F), and a keyboard interface circuit 70 (KB I/F). The central processing unit 60 is further connected through the system bus to a display block 72, an image data memory block 74, and a data compression/extension block 76. These display block 72, image data memory block 74, and data compression/extension block 76 are further connected to an image reader interface circuit 78

and a printer interface circuit 80 through an image data bus.

The central processing unit 60 is predominant over all the phases and aspects of the operation to be performed in the system as a whole under the control of the programs stored in the read-only memory 62. Such phases and aspects of the operation to be governed by the central processing unit 60 include the operation to extract a particular characterizing image area of an image-bearing document and the operation to recognize alphanumerical features on the document.

The hard disk interface circuit 66 is used to transfer to a designated destination the control data relating to the image data stored or to be stored in a hard disk (not shown) and the data representing a main keyword which may be entered through the keyboard 54 by the operator of the system. The optical disk interface circuit 68 transmits to an optical disk (not shown) the image data coded by the data compression/extension block 76 during storage of image data. For displaying of the image stored, the optical disk interface circuit 68 transmits to the data compression/extension block 76 the coded image data supplied from the optical disk. The keyboard interface circuit 70 is used to the central processing unit 60 various pieces of data supplied from the keyboard 54.

The display block 72 is operative to display on the CRT display unit 22 the image represented by the image data

received from image data memory block 74 through the data compression/extension block 76. The display block 72 has a display data storage memory incorporated therein and is further operative to store the image data stored into the display data storage memory directly from the central processing unit 60 per se. On the other hand, the image data memory block 74 has a data storage capacity for storing at least a page of data and is adapted to store the image data supplied through the image reader interface circuit 78. The image data thus stored in the image data memory block 74 is transferred either to the printer interface circuit 80 or to the data compression/extension block 76. The image data memory block 74 is further used to store the data extended by the data compression/extension block 76 and transferred to the memory block 74 and the image data representative of the image in the characterizing image area scanned by the image reader 26.

Data is stored into or fetched from the image data memory block 74 directly under the control of the central processing unit 60 and image data is exchanged between the hard disk interface circuit 66, optical disk interface circuit 68 and data compression/extension block 76. It may be noted that the image data memory block 74 can be accessed either through the system bus or by way of the image data bus as will be seen from Fig. 2.

The data compression/extension block 76 is composed of a

data compression section adapted to code image data and a data extension section adapted to decode coded image data into data of original form. The image data transmitted from the image data memory block 74 and supplied through the image data bus to the data compression/extension block 76 is transferred to the optical disk interface circuit 68 after the data received is coded by the data compression section of the block 76. Furthermore, the coded image data received from the optical disk interface circuit 68 through the system bus is transferred through the image data bus to the image data memory block 74 after the data received is decoded by the data extension section of the block 76.

The image reader interface circuit 78 is operative to transfer to the image data memory block 74 the data representing an image on a document scanned by the image reader 26. Furthermore, the printer interface circuit 80 is operative to transfer to the printer 44 the image data fetched from the image data memory block 74 or the display data storage memory of the display block 72 and controls the printer 44 to produce a printed output of the image information thus supplied to the printer 22.

Description will be hereinafter made regarding the various modes of operation of the image filing system embodying the present invention.

Fig. 3 shows a main routine program to be executed by

the central processing unit 60 which forms part of the controller 20 hereinbefore described with reference to Figs. 1 and 2. Further shown in Fig. 4 is a menu of selectable items which are to be displayed on the screen of the CRT display unit 22 of the system at the start of the main routine program.

When the image filing system is initially switched in and energized, the central processing unit 60 executes step A01 to initialize various operating conditions and parameters of the system in accordance with preset default rules. When the initialization of such operating conditions and parameters of the system is complete, the central processing unit 60 proceeds to step A02 to check if there is a command input from the keyboard 54 demanding the central processing unit 60 to store new image data, search for any data stored, or execute any utility program.

Depending on the nature of the command which may thus be supplied from the keyboard 22, the central processing unit 60 then proceeds to a data storage subroutine program A03, a data search subroutine program A04, or a utility subroutine program A05 as shown. When there is a command demanding the execution of any of these subroutine programs, the name of the particular subroutine program is shown highlighted on the display screen as shown in Fig. 4. Details of the data storage subroutine program A03, data search subroutine

program A04, and utility subroutine program A05 will be hereinafter described with reference to Figs. 5, Figs. 16A and 16B, and Fig. 20, respectively.

Fig. 5 shows the details of the data storage subroutine program A03 included in the main routine program hereinbefore described with reference to Fig. 3.

The data storage subroutine program A03 starts with an image data input control subroutine program B01 through which the image on the document currently in use is read and, thereupon, various parameters are selected for the display of the image on the screen of the CRT display unit 22. Details of this image data input control subroutine program B01 will be hereinafter described with reference to Fig. 6. The central processing unit 60 then proceeds to a keyword input control subroutine program B02 through which a keyword for retrieving a particular document stored in and to be fetched from the image data memory block 74 is to be assigned to the particular document. Details of this keyword input control subroutine program B02 will be hereinafter described with reference to Figs. 8A and 8B.

The keyword input control subroutine program B02 is followed by an image data write control subroutine program B03 through which the image data generated by and supplied from the image reader 26 and stored in the image data memory 74 is to be coded by the data compression/extension block 76 and is then stored into the optical disk through the optical

disk interface circuit 68. Details of this image data write control subroutine program B03 will be hereinafter described with reference to Fig. 14.

Subsequently to the image data write control subroutine program B03, the central processing unit 60 may proceed to a keyword/control data write control subroutine program B04 through which a keyword entered through the keyboard 22 for the retrieval of a particular document and the control data predominant over the document are to be written into the hard disk through the hard disk interface circuit 66. The control data associated with a document may include data designating the location at which the image data is to be stored in the optical disk and the share which the image data is to take in the capacity of the disk. Details of this keyword/control data write control subroutine program B04 will be hereinafter described with reference to Fig. 15.

The subroutine program B04 may be followed by decision step B05 at which is questioned whether or not there is any additional document which the operator of the system desires to have read by the image reader 26. If it is found at this step B05 that there is such a document, the central processing unit 60 reverts to the initial subroutine program B01 and may recycles the subroutine programs B01 to B04 until the answer for the step B05 is given in the affirmative. When the answer for the step B05 is thus given in the affirmative, the central processing unit 60 terminates execution of the data

storage subroutine program A03 and may revert to the main routine program hereinbefore described with reference to Fig. 4.

Fig 6. shows the details of the image data input control subroutine program B01 included in the image data storage routine program A03 hereinbefore described with reference to Fig. 5. This image data input control subroutine program B01 is to be executed responsive to any instruction entered through the keyboard 54 by the operator referencing the selectable items of the menu displayed on the screen of the CRT display unit 22. As illustrated in Fig. 7, the menu is herein assumed to include the following items:

- (1) Image Reading
- (2) Resolution Mode: 400 dpi
- (3) Readout Size: A4(R)
- (4) Exposure Level: Standard
- (5) Magnification/Reduction Ratio: 1/1

Thus, the image data input control subroutine program B01 starts with step C01 at which the central processing unit 60 is responsive to an operator's instruction which may be entered through the keyboard 22 in respect of each of the items on display. At this stage of operation, it is assumed that the document bearing the image information to be stored into the image filing system is either loaded into the automatic document feeder 50 associated with the image reader 26 or placed on the document table of the image reader 26 per

se. The document loaded into the automatic document feeder 50 is conveyed onto the document table of the image reader 26 in response to an operator's instruction demanding the start of the image reading operation.

After the instruction received from the keyboard 22 is thus responded to as at step C01, it is checked at step C02 to see if the image resolution mode has been changed by the operator. It may thus be detected at this step C02 that the resolution mode previously selected has been changed to, for example, the high-density resolution mode selecting the printing density of 400 dpi (dots per inch) or to the standard-density resolution mode selecting the printing density of 200 dpi. If it is found at step C02 that this is the case, such a change in the image resolution mode is effected at step C03, whereupon the central processing unit 60 reverts to step C01 to check for another instruction which may be supplied from the keyboard 22. When there is another instruction supplied from the keyboard 22, the central processing unit 60 proceeds to step C02 for a second time to see if there is another change made in respect of the image resolution mode to be used.

If it is now found at step C02 that there is no change made in respect of the image resolution mode, the step C02 is followed by step C04 to detect whether or not there is an operator's instruction demanding the image reader 26 to start reading of the document placed on the document table of the

image reader 26. If the answer for this step C04 is given in the negative, the central processing unit 60 proceeds to step C05 to prepare for the establishment of conditions conforming to the parameters selected for the individual items on display.

Thereupon, the central processing unit 60 for a second time reverts to step C01 to check for another instruction which may be supplied from the keyboard 22. When there is another instruction supplied from the keyboard 22, the central processing unit 60 proceeds to step C02 and possibly from the step C02 to step C03 to check if there is an operator's instruction demanding the image reader 26 to start reading of the document. If there is such an operator's instruction present and accordingly the answer for this step C04 is given in the affirmative, then the central processing unit 60 proceeds to step C06 to activate the image reader 26 to scan the document on the document table. A beam of light bearing the image information picked up from the document on the table is now directed to an optoelectrical transducer which forms part of the image reader 26, which thus digitize the image information to produce digital signals representing the image read from the document. These signals are supplied as image data through the image reader interface circuit 78 to the image data memory block 74 of the controller 20 of the image filing system. As well known in the art, the image on

the document is in this instance scanned in horizontal or primary direction electrically by the optoelectric transducer and in vertical or secondary direction by the reciprocating movement of the image scanner.

The image data thus stored into the image data memory block 74 of the controller 20 is supplied through the data compression/extension block 76 to the display data storage memory incorporated in the display block 72. A frame or page of image represented by the image data thus received from image data memory block 74 is at step C07 displayed on the CRT display unit 22 with the dots forming each unit image area decimated, if necessary, in a ratio corresponding to the selected magnification/reduction ratio. The purpose of thus decimating the dots forming each unit image area is to make it possible to display the whole image area of the document on the CRT display unit 22 despite the difference between the resolutions available of the image reader 26 and the display unit 22. After execution of the step C07, the central processing unit 60 terminates the execution of the image data input control subroutine program B01 and may revert to the image data storage subroutine program A03 hereinbefore described with reference to Fig. 5.

Figs. 8A and 8B show the details of the keyword input control subroutine program B02 also included in the image data storage routine program A03 hereinbefore described with reference to Fig. 5. Further shown in Fig. 9 is a menu of

selectable items which are to be displayed on the screen of the CRT display unit 22 at the start of the keyword input control subroutine program B02.

The keyword input control subroutine program B02 herein shown starts with step D01 at which an auxiliary keyword registration flag "FKWR" is reset to logic "0" state. This auxiliary keyword registration flag "FKWR" is indicative of whether or not an auxiliary keyword indicating a "characterizing" image area of a document which represents the prominent feature of the document is to be registered. Such an auxiliary keyword is stored independently of the image information picked up from a document and is used as ancillary document retrieval information in addition to the "main" keyword information in the form of a sequence of alphanumeric letters. This type of ancillary document retrieval information assigned to a particular document will be herein after referred to as auxiliary or image keyword. The auxiliary keyword registration flag "FKWR" reset to logic "0" state at step D01 thus indicates that the image keyword associated with the document currently in use is not to be registered. The image keyword herein used may be in the form of a drawing, a graph, a table or a portion of such a graphic feature or any alphanumerical or symbolic feature.

Subsequently to step D01, the central processing unit 60 proceeds to step D02 to reset an image data save flag "FDS" to logic "0" state. This image data save flag "FDS" is

indicative of whether or not the period of time for which the image data generated from the document currently in use is to be saved should be designated in respect of the particular image data. Thus, the image data save flag "FDS" reset to logic "0" state at step D02 indicates that the period of time for which the image data generated from the document currently in use is to be saved need not to be designated.

The step D02 is followed by step D03 at which the central processing unit 60 is responsive to an instruction which may be received from the keyboard 22. The operator of the system may key in a keyword or two or more keywords for the document currently in use while referencing the menu displayed on the screen of the CRT display unit 22 as illustrated in Fig. 9.

After a keyword or a plurality of keywords received from the keyboard 22 are thus responded to by the central processing unit 60 as at step D03, it is checked at step D04 to see if entry of any information through the keyboard 54 is complete for the document currently in use. The information which may be entered through the keyboard 54 as queried at this step D04 may be, for example, the image keywords "1" to "5" as shown in Fig. 9. If it is found at step D04 that this is the case, the central processing unit 60 terminates the execution of this keyword input control subroutine program B02 and may revert to the image data storage subroutine program A03 hereinbefore described with reference to Fig. 5.

If it is found at step D04 that entry of information through the keyboard 54 is still in progress and accordingly the answer for the step D04 is given in the negative, it is checked at step D05 if the instruction received from the keyboard 22 as at step D03 is a request for registering an image keyword. If the answer for this step D05 is given in the negative, the central processing unit 60 proceeds to step D06 to check if there is any period of time designated for the saving of the image data to be read from the document currently in use. This decision is made on the basis of the image data save flag "FDS" which is to be set to logic "1" state when such a period of time is designated through the keyboard 54.

If it is found at step D06 that there is no period of time designated for the saving of the image data, the central processing unit 60 proceeds to step D07 to execute an ordinary procedure necessary for the registration of the keyword or keywords entered. On termination of such a procedure at step D07, the central processing unit 60 reverts to step D03 and may thus repeat the steps D03 to D07 if the answer for each of the steps D04 to D06 is given in the negative.

If it is found at step D05 that the instruction received from the keyboard 22 as at step D03 is a request for registering an image keyword, the central processing unit 60

proceeds to step D08 to set the image keyword registration flag "FKWR" to logic "1" state. Subsequently to step D08, the central processing unit 60 executes an image keyword area defining subroutine program D09 to define an image keyword area specific to the document currently in use as the previously mentioned characterizing image area for the document. Details of this image keyword area defining subroutine program D09 will be hereinafter described with reference to Figs. 12A and 12B.

On the other hand if it is found at step D06 that there is a period of time designated for the saving of the image data generated from the document currently in use, the central processing unit 60 then proceeds to step D10 to confirm whether or not the "operator level" is acceptable. The "operator level" herein referred to is indicative of the degree of the operator's capability and/or the degree of the operator's experiences or skills required for the registration and saving of image information in the system under consideration and may be predetermined for the status and office which each of the possible users of the system has in the organization to which the user belongs. The data representing such criteria for determining the operator level is contained in the operator's identification code entered into the system when the system is initially booted up.

If it is found at step D10 that the operator level is not acceptable, the central processing unit 60 reverts to

step D03. On the other hand, if it is found at the step D10 that the operator level is acceptable and accordingly the answer for the step D10 is given in the affirmative, the central processing unit 60 executes a saving period data storage subroutine program D11 to store into the hard disk the data representing the designated period of time for the saving of the image data to be read from the document in use. Details of this saving period data storage subroutine program D11 will be hereinafter described with reference to Fig. 10. After execution of the saving period data storage subroutine program D11, the central processing unit 60 also reverts to step D03.

Figs. 8C and 8D are flowcharts showing an alternative example of the keyword input control subroutine program illustrated in Figs. 8A and 8B.

In the keyword input control subroutine program B02 herein shown, the step D04 is followed directly by step D06 when it is found at step D04 that entry of information through the keyboard 54 is still in progress and accordingly the answer for the step D04 is given in the negative. Thus, when the answer for the step D04 is given in the negative, it is immediately checked at step D06 if there is any period of time designated for the saving of the image data to be read from the document currently in use.

If it is found at step D04 that entry of information through the keyboard 54 is complete for the document



currently in use, the central processing unit 60 proceeds to step D12 to check into the control data stored in the form of table data in the hard disk. Thereafter, it is detected at step D13 whether or not the main keyword which has already been entered and stored in the hard disk is identical with the keyword which is about to be loaded into the disk. If the answer for this step D13 is given in the negative, the central processing unit 60 terminates the execution of this keyword input control subroutine program B02 and may revert to the image data storage subroutine program A03 hereinbefore described with reference to Fig. 5.

If the answer for this step D13 is given in the affirmative, the central processing unit 60 proceeds to step D08 to set the image keyword registration flag "FKWR" to logic "1" state. Subsequently to step D08, the central processing unit 60 executes an image keyword area defining subroutine program D09 to define an image keyword area specific to the document currently in use as in the subroutine program described with reference to Figs. 8A and 8B. When it is found at step D06 that there is a period of time designated for the saving of the image data generated from the document currently in use, the central processing unit 60 proceeds to step D10 to confirm whether or not the operator level is acceptable, as has also been described with reference to Figs. 8A and 8B.

Fig. 10 shows the details of the image data saving

period data storage subroutine program D11 included in the keyword input control subroutine program B02 hereinbefore described with reference to Figs. 8A and 8B. Illustrated in Fig. 11 is a frame of image which may be displayed on the screen of the CRT display unit 22 after the period of time for which the image data to be read from the document currently in use is to be saved is designated during execution of the subroutine program D11.

The image data saving period data storage subroutine program D11 starts with step E01 to set the image data save flag "FDS" to logic "1" state. Subsequently to step E01, the central processing unit 60 proceeds to step E02 to respond to the data representing the image data saving period of time designated by the operator of the system. The central processing unit 60 having executed the step E02 terminates the execution of the image data saving period data storage subroutine program D11 and may revert to the keyword input control subroutine program B02 hereinbefore described with reference to Figs. 8A and 8B.

Figs. 12A and 12B are flowcharts showing details of the image keyword area defining subroutine program D09 further included in the keyword input control subroutine program B02 hereinbefore described with reference to Figs. 8A and 8B. Further shown in Fig. 13 is a frame of image which is to be displayed on the screen of the CRT display unit 22 to prompt the operator to enter data for defining the image keyword

area designated.

The image keyword area defining subroutine program D09 starts with step F01 to withdraw from the screen of the CRT display unit 22 the image frame indicated in Fig. 11. The central processing unit 60 then proceeds to step F02 to display on the screen of the CRT display unit 22 a frame of image represented by the image data fetched from the display data storage memory of the display block 72 to which the image data read from the document in use has been transferred from the image data memory block 74. The step F02 is followed by step F03 at which the x-axis and y-axis coordinate values IKXS and IKYS indicative of the starting coordinate point of an image keyword area are set each at a predetermined initial value of, for example, "0". The step F03 in turn is followed by step F04 at which the measurements IKXL and IKYL indicative of the measurements from the starting coordinate point of the image keyword area are set at predetermined initial values  $L_x$  and  $L_y$ , respectively.

With the numerical data representing the starting the coordinate values IKXS and IKYS and the measurements IKXL and IKYL thus initialized at steps F03 and F04, the central processing unit 60 proceeds to step F05 to display on the screen of the CRT display unit 22 a frame of image containing the image keyword area defined by these numerical data. Thereafter, the central processing unit 60 proceeds to step F06 and is responsive to an operator's instruction which may

be entered through the keyboard 54 by the operator of the system. Thus, if it is detected at step F07 that an operator's instruction is entered to request movement of the starting point of the image keyword, the step F07 is followed by step F08 at which either the x-axis coordinate value IKXS or the y-axis coordinate value IKYS of the starting coordinate point of the image keyword area currently on display is updated, viz., either incremented or decremented and the image keyword area defined by the updated x-axis or y-axis coordinate value IKXS or IKYS is displayed on the screen of the CRT display unit 22.

If it is detected at step F09 that an operator's instruction is entered to increase or decrease the measurement of the image keyword area from the starting point in the x-axis or y-axis direction, the initial numerical value of either the measurement IKXL or the measurement IKYL of the image keyword area currently on display is either incremented or decremented and the image keyword area defined by the updated measurement IKXL or IKYL is displayed on the screen of the CRT display unit 22 as at step F10. Illustrated in Fig. 13 is an example of the frame of image which is thus finally defined through execution of the steps F07 and F08 and steps F09 and F10 and displayed on the screen of the CRT display unit 22.

The movement of the starting point of an image keyword area or the alteration of the x-axis and y-axis measurements

may be effected through concurrent manipulation of a "move" request key or a "change length" request key and any of the cursor keys similar to those provided in an ordinary keyboard of, for example, a personal computer.

When it is then detected at step F11 that an operator's instruction is entered through the keyboard 54 to put an end to the image keyword area defining operation with, for example, an "end" key depressed on the keyboard 54, the central processing unit 60 proceeds to step F12 to restore the image frame of Fig. 11 on the screen of the CRT display unit 22. The central processing unit 60 then terminates the execution of the image keyword area defining subroutine program D09 and may revert to the keyword input control subroutine program B02 hereinbefore described with reference to Figs. 8A and 8B. Subsequently to step F08 or step F10 or when it is found at step F11 that an operator's instruction to put an end to the image keyword area defining operation is not entered, the central processing unit 60 returns to step F05 and may repeat any of the loops formed by the steps F09 to F11 until it is finally determined at step F12 that the defining of the image keyword area is complete.

Fig. 14 shows the details of the image data write control subroutine program B03 also included in the image data storage routine program A03 hereinbefore described with reference to Fig. 5.

The image data write control subroutine program B03

starts with step G01 at which the image data which has been stored in the image data memory block 74 is transferred to the data compression/extension block 76 and is coded and compressed therein. Subsequently, the central processing unit 60 proceeds to step G02 to calculate the address at which the image data is to be stored into the optical disk. The starting address to be thus assigned to the image data to be registered is immediately subsequent to the address assigned to the image data which was last stored into the optical disk.

The step G02 is followed by step G03 at which the image data which has been coded and compressed by the pieces of data compression/extension block 76 is transferred to and stored into the optical disk through the optical disk interface circuit 68 successively in a sequence starting with the address calculated at step G02. The central processing unit 60 then proceeds to step G04 at which the final address assigned to the image data thus stored into the optical disk is extracted for storage as control data into the hard disk.

Fig. 15 shows the details of the keyword/control data write control subroutine program B04 further included in the image data storage routine program A03 hereinbefore described with reference to Fig. 5.

The keyword/control data write control subroutine program B04 starts with step H01 to check if the image keyword registration flag "FKWR" is set to logic "1" state.

The image keyword registration flag "FKWR" of logic "1" state indicates that the period of time for which the image data generated from the document currently in use is to be saved should be designated. If the answer for this step H01 is given in the affirmative, the central processing unit 60 proceeds to step H02 to calculate the starting address at which the image data is to be stored into the optical disk. Subsequently, it is detected at step H03 whether or not the high-density resolution mode is currently selected providing the printing density of 400 dpi. The central processing unit 60 then proceeds to step H04 or step H05 to load into the optical disk the image data stored in the image data memory block 74 and contained in an image area corresponding to the area defined by the coordinate values IKXS and IKYS and measurements IKXL and IKYL at steps F08 and F10 of the image keyword area defining subroutine program D09 (Figs. 12A and 12B). If, in this instance, it is found at step H03 that the high-density resolution mode is currently selected and accordingly the answer for the step H03 is given in the affirmative, the step H03 is followed by step H04 at which the image data is transferred to the optical disk through the optical disk interface circuit 68 with the dots forming each unit image area decimated in a ratio corresponding to the selected magnification/reduction ratio. On the other hand, if the answer for the step H03 is given in the negative, then the step H03 is followed by step H05 at which the image data

is as it is transferred to the optical disk through the optical disk interface circuit 68. As has been noted, the purpose of thus decimating the dots forming each unit image area of the image to be stored into the optical disk is to display the whole image area of the document on the CRT display unit 22.

It may be further added that the image data contained in the image area corresponding to the area defined by the coordinate values IKXS and IKYS and measurements IKXL and IKYL as above described is stored as image keyword data into the optical disk in a memory area such as for example a page or a filing area different from the memory area into which the ordinary image data is to be stored. It may also be noted that the image keyword data is stored into the optical disk without being compressed in the data compression/extension block 76. This is because of the fact that the area in which the image keyword is to be displayed on the screen of the display unit ordinarily has a relatively small size requiring a relatively small share in the total data storage capacity available in the optical disk. The image keyword data being thus not compressed when the data is stored into the optical disk, the data need not be decoded and extended when the image keyword represented by the data is to be on display and can therefore be processed in a significantly short period of time.

It may be further added that, while the dots-forming the

image keyword data to be transferred to the optical disk are decimated only when the high-density resolution mode is selected, the decimation of the dots forming such data may be effected to reduce the density resolution if the ordinary density or any other density is selected for the display of the image keyword.

Subsequently to the step H04 or step H05, the central processing unit 60 proceeds to step H06 to fetch the final address assigned to the image keyword data which has thus been stored into the optical disk. The step H06 is followed by step H07 at which each of the numerical values indicating the count numbers  $N_p$  and  $N_D$  for printing and displaying is reset to "0". This step H07 is executed also when it is found at step H01 that the image keyword registration flag "FKWR" is set to logic "1" state and as such the answer for the step H01 is given in the negative.

Having executed the step H07, the central processing unit 60 proceeds to step H08 to calculate the starting address at which the control data associated with the image data which has been stored into the optical disk as has been described with reference to Fig. 14 is to be stored into the hard disk. The step H08 is followed by step H09 at which the control data is now transferred to the hard disk by way of the hard disk interface circuit 66, whereupon the central processing unit 60 puts an end to execution of the keyword/control data write control subroutine program B04 and may

revert to the image data storage routine program A03 hereinbefore described with reference to Fig. 5.

The control data stored into the hard disk as at step H09 is formulated in the form of table data and include

- (1) image keyword registration flag (FKWR),  
image keyword start track,  
image keyword end track,  
x-axis measurement of image keyword,  
y-axis measurement of image keyword,
- (2) image area start track,  
image area end track,  
dot density,  
x-axis measurement of image area,  
y-axis measurement of image area,  
manner of data compression,
- (3) image data save flag (FDS),  
period of time for saving image data,  
count number for printing ( $N_p$ ),  
count number for displaying ( $N_D$ ),  
date of data reservation,  
keyword "1",  
keyword "2",  
keyword "3",  
keyword "4",  
keyword "5".

Figs. 16A and 16B show the details of the data search

subroutine program A04 also included in the main routine program hereinbefore described with reference to Fig. 3. Shown in Fig. 17A is a menu of selectable items which are to be displayed on the screen of the CRT display unit 22 of the system at the start of the data search subroutine program A04. Fig. 17B further shows a frame of image which may be on display during execution of the data search subroutine program A04.

The data search subroutine program A04 starts with step I01 at which the central processing unit 60 is responsive to a main keyword which may be entered through the keyboard 54 by the operator of the system. The central processing unit 60 then proceeds to step I02 to check if there is an operator's instruction entered through the keyboard 54 to put an end to the operation to search for a document. If it is found at this step I02 that there is such an instruction entered through the keyboard 54, the central processing unit 60 terminates execution of the data search subroutine program A04 and may revert to the main routine program hereinbefore described with reference to Fig. 3.

If it is found at step I02 that there currently is no instruction to terminate the search for a document, the central processing unit 60 proceeds to step I03 to search into the control data table stored in the hard disk for the document to which the main keyword entered is assigned. It is then detected at step I04 whether or not the target document is discovered. If it is determined at this step I04

that the target document is not found and accordingly the answer for the step I04 is given in the negative, the central processing unit 60 reverts to step I01 and may repeat the loop of the steps I01 to I04.

When it is thereafter determined that the document represented by the main keyword entered is discovered, then the central processing unit 60 proceeds to a document list display subroutine program I05 to display the list of the main keywords for the documents including the target document on the screen of the CRT display unit 22. The operator of the system will then select the target document from among the documents listed on the screen of the display unit 22 and enter an instruction to select the particular document. The central processing unit 60 is thus responsive to this instruction as at step I06 and thereupon proceeds to step I07 to check if there is an operator's instruction entered through the keyboard 54 to put an end to the document search operation. If it is found at this step I07 that there is no such instruction entered through the keyboard 54, the central processing unit 60 also reverts to step I01 and may repeat the loop of the steps I01 to I04.

When it is found at step I07 that there is an instruction to put an end to the document search operation entered through the keyboard 54, then the central processing unit 60 proceeds to step I08 to read from the optical disk the image data associated with the control data for the document

selected at step I06. The image data thus fetched from the optical disk is transmitted through the optical disk interface circuit 68 to the data compression/extension block 76 and is thereby decoded and extended. The decoded image data is transferred to the image data memory block 74 and the image represented by the data is displayed on the screen of the CRT display unit 22. Shown in Fig. 17B is an example of a frame of image which may thus be displayed on the CRT display unit 22.

After the image of the document under consideration is displayed on the CRT display unit 22 in this manner, the central processing unit 60 proceeds to step I10 to update the count number  $N_D$  for displaying to the frame of the image currently on display and the updated count number  $N_D$  is stored as part of control data into the hard disk through the hard disk interface circuit 66. If it is desired by the operator of the system to produce a printed version of the image on display, an instruction to such an effect will be entered through the keyboard 54 at step I11. The central processing unit 60 is responsive to this instruction as at step I12 and at step I13 updates the count number  $N_p$  for printing to the frame of the image to be printed. Subsequently, the image data stored in the image data memory block 74 is transmitted through the printer interface circuit 80 to the printer 44 of the system and the image represented by the data is printed at step I14.

Fig. 18 shows the details of the document list display subroutine program I05 included in the data search subroutine program A04 hereinbefore described with reference to Figs. 16A and 16B. Shown in Fig. 19 is a frame of image indicating the main keywords and auxiliary or image keywords associated with the documents listed on the screen of the CRT display unit 22 of the system during execution of the document list display subroutine program I05.

The document list display subroutine program I05 starts with step J01 to calculate addresses at which the list of the keywords for the documents including the target document is to be displayed on the screen of the CRT display unit 22. The central processing unit 60 then proceeds to step J02 to check if the complete list of the main keywords for the documents including the target document has been displayed on the CRT display unit 22. If the answer for the step J02 is given in the affirmative, the central processing unit 60 terminates execution of this document list display subroutine program I05 and may revert to the data search subroutine program A04 described with reference to Figs. 16A and 16B.

If there remains a document which has been retrieved but which is not yet been listed on the display unit 22, the answer for the step J02 is given in the negative, the step J02 is followed by step J03 at which is detected whether or not there is a free area available on the screen of the CRT display unit 22. If it is determined that there is no free

area left on the screen of the display unit 22 and accordingly the answer for the step J03 is given in the negative, the central processing unit 60 also terminates execution of this document list display subroutine program I05 and may revert to the data search subroutine program A04.

If it is found at step J03 that there remains a free area available on the screen of the CRT display unit 22 and accordingly the answer for the step J03 is given in the affirmative, the step J03 is followed by step J04 at which the main keyword or keywords representative of the additional document or documents are listed on the CRT display unit 22. Subsequently to step J04, the central processing unit 60 proceeds to step J05 to detect whether or not the image keyword registration flag "FKWR" is set to logic "1" state. If the answer for this step J05 is given in the negative, the central processing unit 60 reverts to step J02 to repeat the loop of the steps J02 to J05 or terminate execution of this subroutine program I05.

On the other hand, if it is determined at step J05 that the image keyword registration flag "FKWR" is set to logic "1" state and as such the answer for the step J05 is given in the affirmative, the central processing unit 60 proceeds to step J06 to read from the optical disk the image keyword data included in the control data for the target document. The image keyword data thus fetched from the optical disk is transferred by way of the optical disk interface circuit 68

to the display data storage memory of the display memory block 72 and the image keyword represented by the image keyword data is displayed on the screen of the CRT display unit 22. Shown in Fig. 19 is a frame of image indicating the main keywords and auxiliary or image keywords associated with the documents "1" to "6" thus listed on the screen of the CRT display unit 22 of the system at step J06.

In preparation for the display of another set of documents on the CRT display unit 22, the step J06 is followed by step J07 to calculate new addresses at which the list of the keywords for the additional documents is to be displayed on the screen of the CRT display unit 22. The central processing unit 60 then reverts to step J02 to repeat the loop of the steps J02 to J05 or steps J02 to J07 or terminate execution of this subroutine program I05 to revert to the data search subroutine program A04 described with reference to Figs. 16A and 16B.

Fig. 20 shows the details of the utility subroutine program A05 further included in the main routine program hereinbefore described with reference to Fig. 3.

The utility subroutine program A05 herein shown starts with step K01 at which the central processing unit 60 is responsive to an instruction which may be entered through the keyboard 54 by the operator of the system. The instruction which the central processing unit 60 may thus receive from the keyboard 54 in this instance may be for the execution of



a file renewal subroutine program K02, a batch renewal subroutine program K03 or a subroutine program K04 for executing any other utility process. Details of these file renewal subroutine program K02 and batch renewal K03 will be hereinafter described with reference to Figs. 21A and 21B and Fig. 23, respectively.

Figs. 21A and 21B show the details of the file renewal subroutine program K02 included in the utility subroutine program A05 above described with reference to Fig. 20. Illustrated in Fig. 22 is a menu of selectable items which are to be displayed on the CRT display unit 22 of the system at the start of the file renewal subroutine program K02.

The file renewal subroutine program K02 starts with step L01 at which the control data associated with the image data of a document stored in the hard disk is fetched through the hard disk interface circuit 66. The central processing unit 60 then proceeds to step L02 to check if there is no document to be handled by this file renewal subroutine program K02. If the answer for this step L02 is given in the negative, the central processing unit 60 proceeds to step L03 to display the main keyword or keywords of the document having the control data thus fetched from the hard disk. The central processing unit 60 thereafter proceeds to step L04 to detect whether or not the image data save flag "FDS" is set to logic "1" state for the document. If the answer for this step L04 is given in the affirmative in respect of the document,

the central processing unit 60 further checks at step L05 if the period of time for which the document currently retrieved was determined to be saved has lapsed or not. If the answer for this step L05 is also given in the affirmative, the central processing unit 60 proceeds to step L06 at which the period of time for which the particular document was determined to be saved and the message showing that such a period of time has already lapsed are indicated on the screen of the CRT display unit 22.

If, on the other hand, it is found at step L04 that the image data save flag "FDS" is not set to logic "1" state for the document and thus the answer for the step L04 is given in the negative, the central processing unit 60 checks at step L07 if a predetermined period of time has lapsed since the particular document was registered. If the answer for this step L07 is given in the affirmative, the step L07 is followed by the step L06 and the period of time for which the document was determined to be saved and the message showing that the period of time has already lapsed are indicated on the CRT display unit 22. If the answer for the step L07 is given in the negative, the step L06 is skipped over and the step L07 is followed by step L08.

The step L08 is executed either subsequently to the step L06 or if the answer for the step L05 or step L07 is given in the negative, wherein it is determined whether or not the currently valid count numbers  $N_p$  and  $N_D$  for printing and

displaying are reasonable ones. Such a decision may be made by examining if the count number  $N_D$  for displaying is larger than the count number  $N_p$  for printing times two, viz.,

$$N_D > N_p * 2.$$

When the count number  $N_D$  is found to be larger than the count number  $N_p$  times two in respect of the document retrieved and currently indicated on the screen of the CRT display unit 22, it is considered that the number of times the document has been printed out is significantly smaller than the number of times the document is called to the display. This in turn will mean that the particular document is quite unlikely to be the target document which the operator desires to reference. Thus, it may be checked at step L08 if the count number  $N_D$  for displaying is larger than the count number  $N_p$  for printing times two in respect of the document. If it is determined at this step L08 that the currently valid count numbers  $N_p$  and  $N_D$  for printing and displaying are reasonable for the document, the step L08 is followed by step L09 at which the keyword which was used for the retrieval of the target document is deemed inappropriate and a message to such an effect is indicated on the screen of the CRT display unit 22.

Subsequently to step L09 or if it is found at step L08 that the count numbers  $N_p$  and  $N_D$  for printing and displaying are reasonable for the document, the central processing unit 60 proceeds to step L10 so as to be responsive to any

instruction which may be entered through the keyboard 54 by the operator of the system. This step L10 is also executed when it is found at step L02 that there is no document to be handled by this file renewal subroutine program K02.

It is thus checked at step L11 if there is an instruction to put an end to the file renewal subroutine program K02. If the answer for this step L11 is given in the affirmative negative, the central processing unit 60 terminates execution of this file renewal subroutine program K02 and may revert to the utility subroutine program A05 hereinbefore described with reference to Fig. 20. If it is found at step L11 that there is no instruction to put an end to the subroutine program K02, the central processing unit 60 proceeds to step L12 to detect whether or not there is an instruction requiring the renewal of another document. If the answer for this step L12 is given in the affirmative, the central processing unit 60 return to step L01 and may repeat the loop of the steps L01 to L12 until the answer for the step L11 turns affirmative or the answer for the step L12 turns negative.

When it is found at step L12 that there is no additional document to be renewed and accordingly the answer for the step L12 is given in the negative, the central processing unit 60 proceeds to step L13 to check if there is an

instruction requiring deletion of the document retrieved. If the answer for this step L13 is given in the affirmative, the central processing unit 60 proceeds to step L14 to perform a procedure to delete the control data for the particular document from the hard disk. It may be noted that the optical disk used in the system under consideration is assumed to be of the read-only memory type and, accordingly, the image data for the document having the control data thus deleted from the hard disk is maintained in the optical disk but is not accessible with no control data available in association with the image data.

On the other hand, if there is no instruction requiring deletion of the document under consideration, it is checked at step L15 whether or not there is an instruction requiring a change of the keyword for the document retrieved. If the answer for this step L15 is given in the affirmative, the central processing unit 60 proceeds to step L16 to perform a procedure to change the keyword for the document. If it is found at step L15 that there is no instruction requiring a change of the keyword for the document and thus the answer for the step L15 is given in the negative, the central processing unit 60 reverts to step L10 and may repeat the loop of the steps subsequent to the step L10 until the answer for the step L11 turns affirmative.

Fig. 23 shows the details of the batch renewal subroutine program K03 also included in the utility subroutine

program A05 hereinbefore described with reference to Fig. 20.

The batch renewal subroutine program K03 starts with step M01 at which the control data associated with the image data of a document stored in the hard disk are fetched through the hard disk interface circuit 66. The central processing unit 60 then proceeds to step M02 to check if there is no document to be handled by this batch renewal subroutine program K03. If the answer for this step M02 is given in the affirmative, the central processing unit 60 terminates execution of this batch renewal subroutine program K03 and may revert to the utility subroutine program A05 hereinbefore described with reference to Fig. 20. If it is found at step M02 that there is no document to be handled by this batch renewal subroutine program K03, the central processing unit 60 proceeds to step M03 to detect whether or not the image data save flag "FDS" is set to logic "1" state for the document. If the answer for this step M03 is given in the affirmative in respect of the document, the central processing unit 60 further checks at step M04 if the period of time for which the document currently retrieved was determined to be saved has lapsed or not. If the answer for this step M04 is also given in the affirmative, the central processing unit 60 proceeds to step M05 to perform a procedure to delete the control data for the particular document from the hard disk.

On the other hand, if it is found at step M03 that the

image data save flag "FDS" is not set to logic "1" state for the document and thus the answer for the step M03 is given in the negative, the central processing unit 60 checks at step M06 if a predetermined period of time has lapsed since the particular document was registered. If the answer for this step M06 is given in the affirmative, the step M06 is followed by the step M05 to perform the delete procedure. If the answer for the step M06 is given in the negative, the step M06 is skipped over and the central processing unit 60 may revert to step M01 and may repeat the loop of the steps M01 to M06 until the answer for the step M02 turns affirmative.

While the deletion of a document is effected with the control data for the document deleted from the hard disk, any appropriate means may be provided to determine whether a document should be deleted or to automatically delete a document on confirmation that the document has been saved for a predetermined period of time.

It may be further noted that, while the image keyword data is stored into the optical disk without being coded and compressed before the data is loaded into the disk, image keyword data used in a system according to the present invention may be coded and compressed by means of the data compression/extension block 76 before the data is loaded into the optical disk.

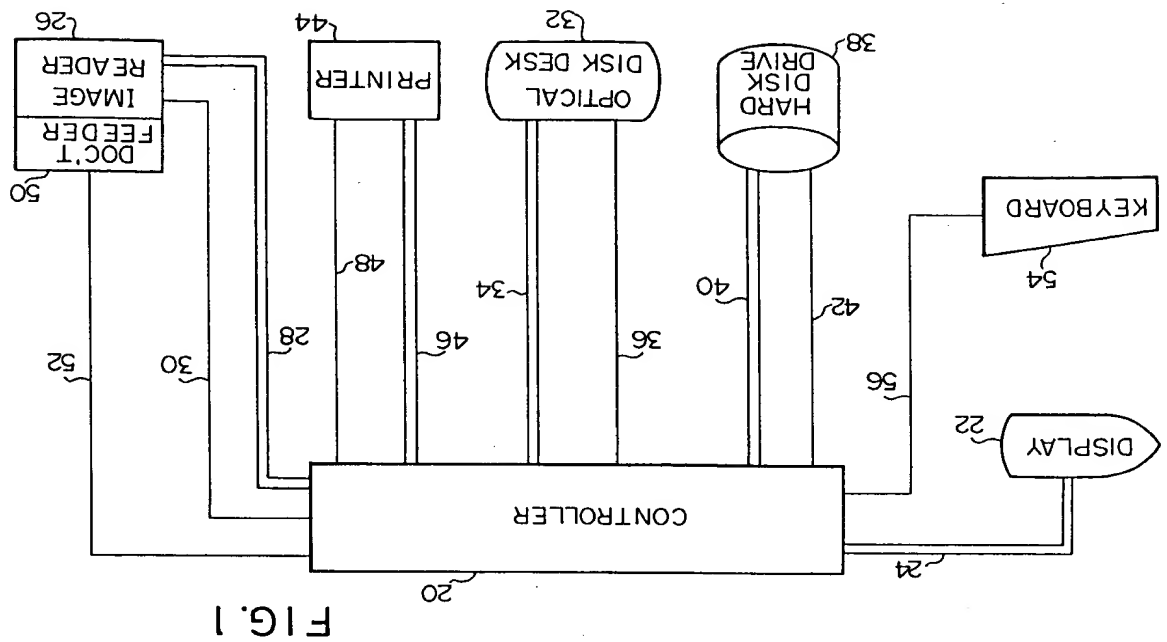


FIG. 2

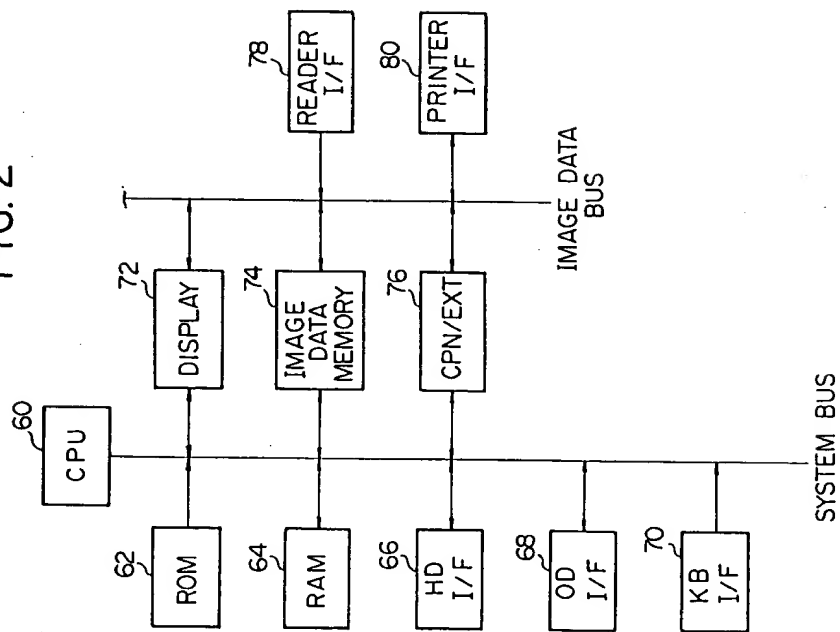


FIG. 3

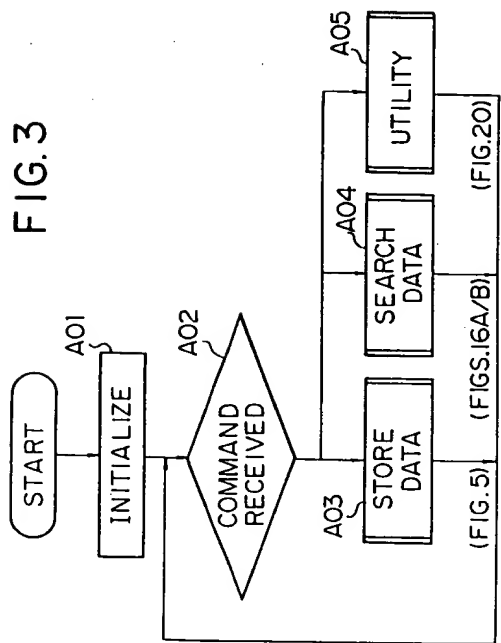


FIG. 4

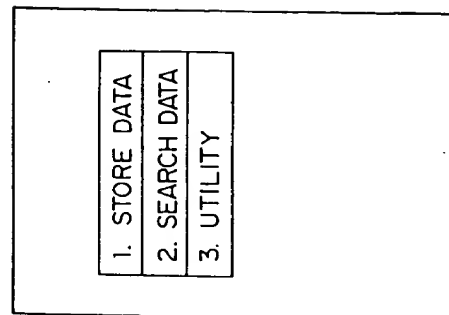


FIG.5

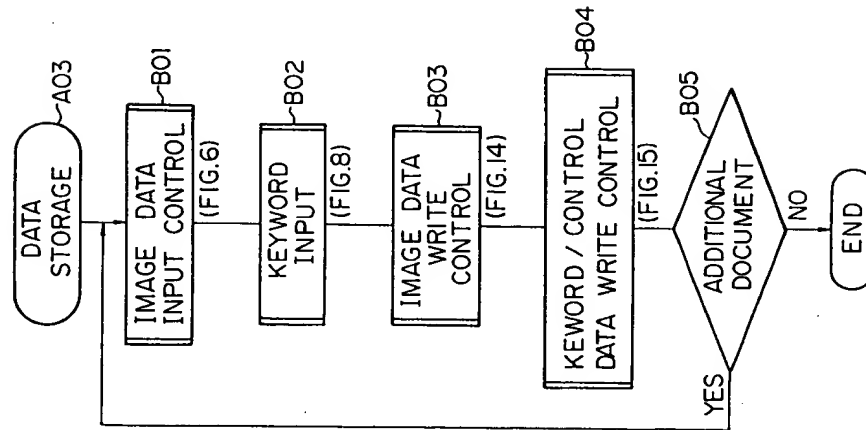


FIG.6

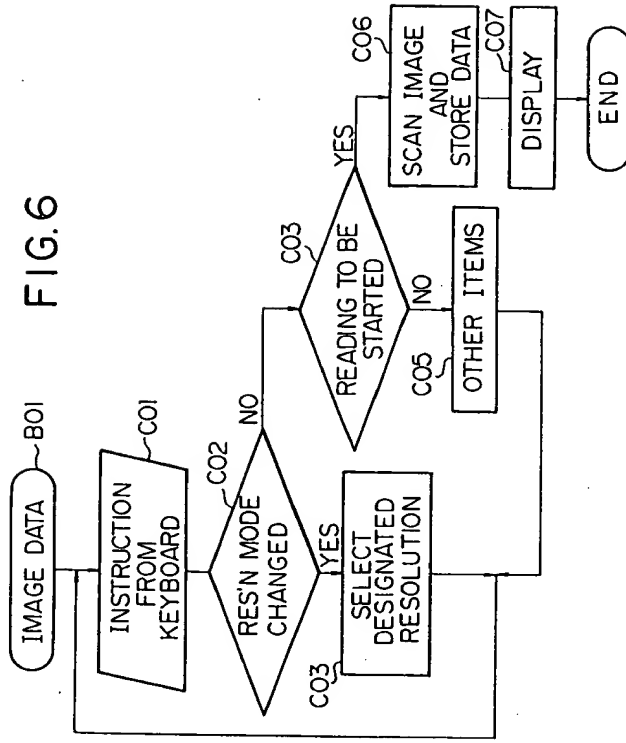


FIG.7

1. IMAGE READING
2. MODE : 400 dpi
3. READOUT STZE: A4(R)
4. EXP. LEVEL : STD
5. HALFTONE : NIL
6. M/R RATIO : 1/1

FIG.8A

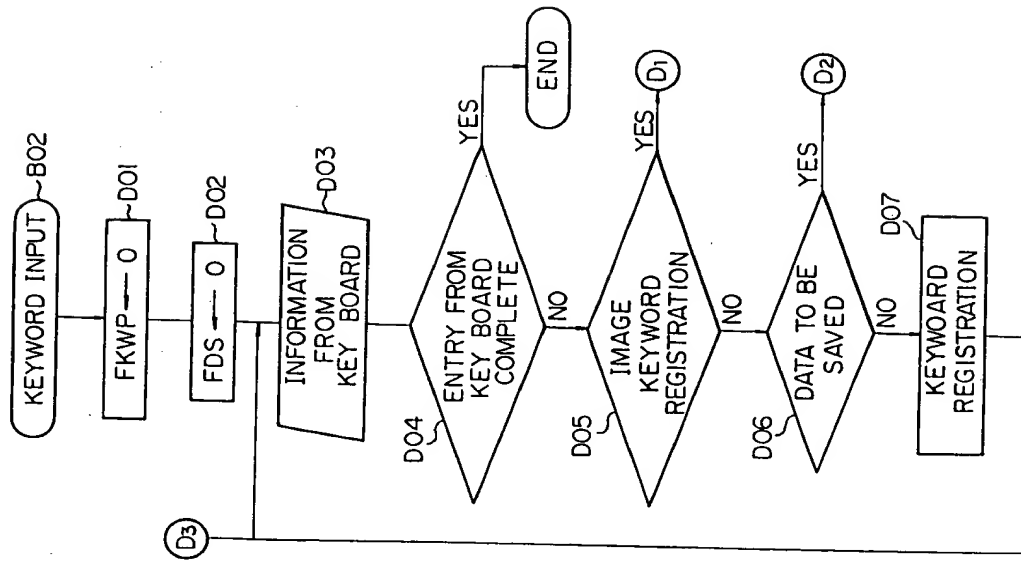


FIG.8B

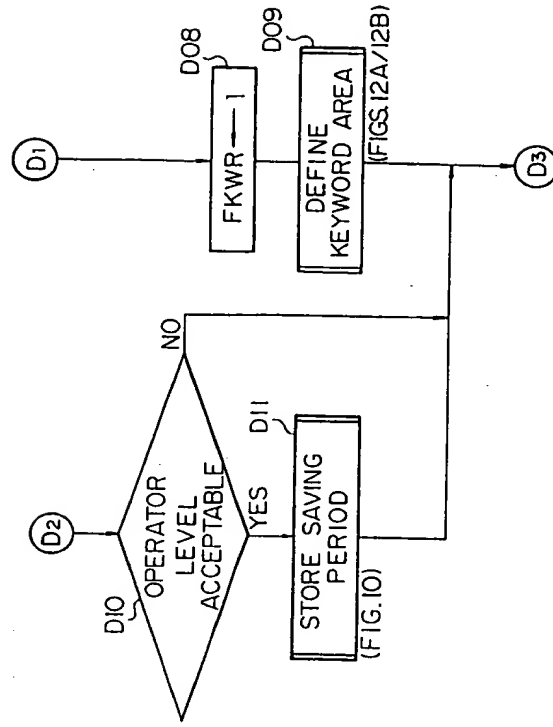


FIG.10

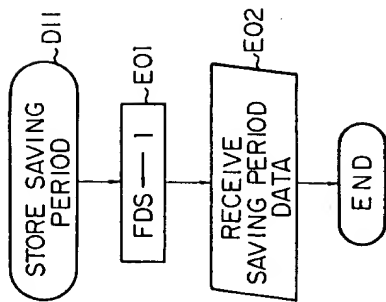


FIG.11

KEYWORD RESERVATION	
DATA TO BE SAVED FOR 2 YRS & 0 MTHS	
KEYWORD '1'	
KEYWORD '2'	
KEYWORD '3'	
KEYWORD '4'	
KEYWORD '5'	
END	

FIG.8D

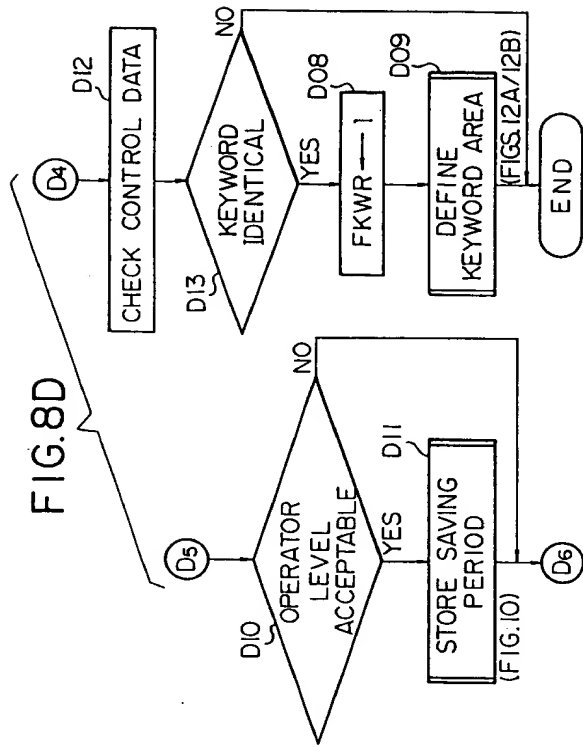


FIG.9

KEYWORD REGISTRATION	
SAVE	
KEYWORD '1'	
KEYWORD '2'	
KEYWORD '3'	
KEYWORD '4'	
KEYWORD '5'	
END	



FIG.8C

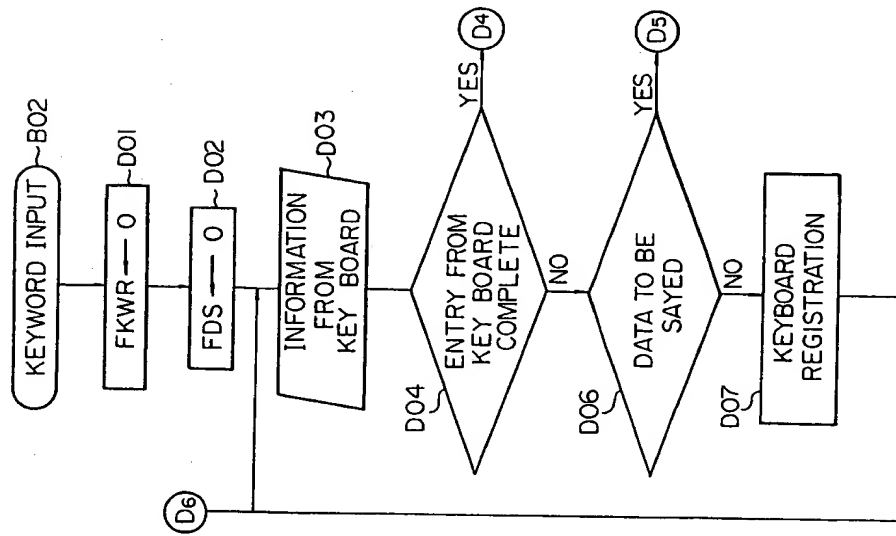
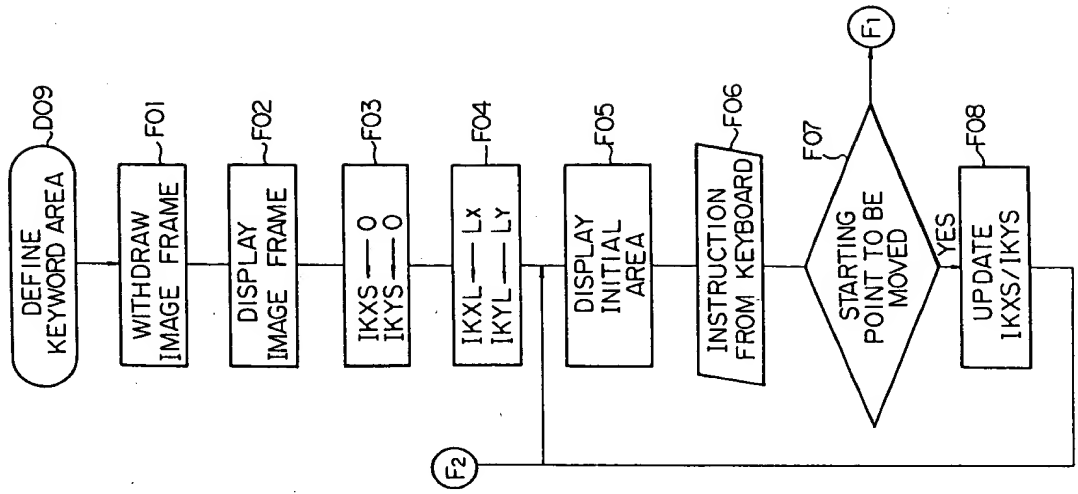
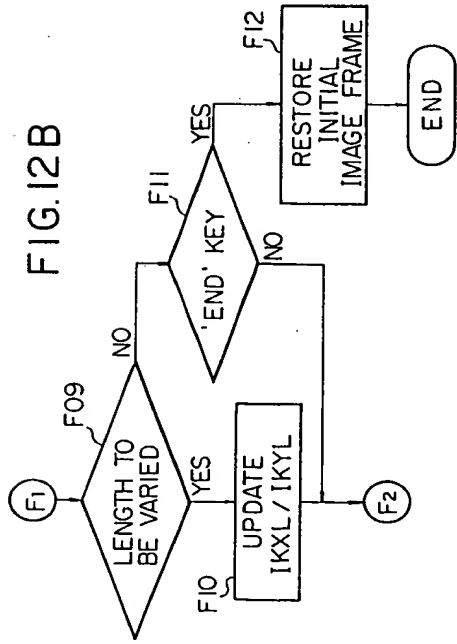
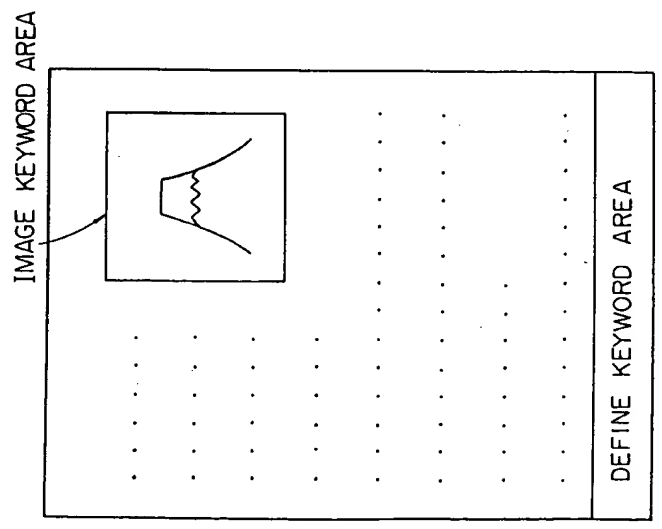


FIG.12A

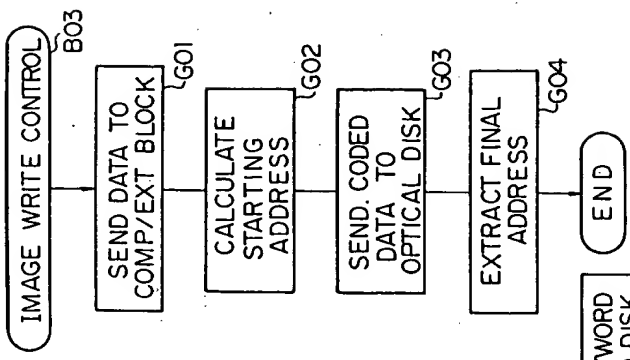




**FIG. 13**



**FIG. 14**



**FIG. 15**

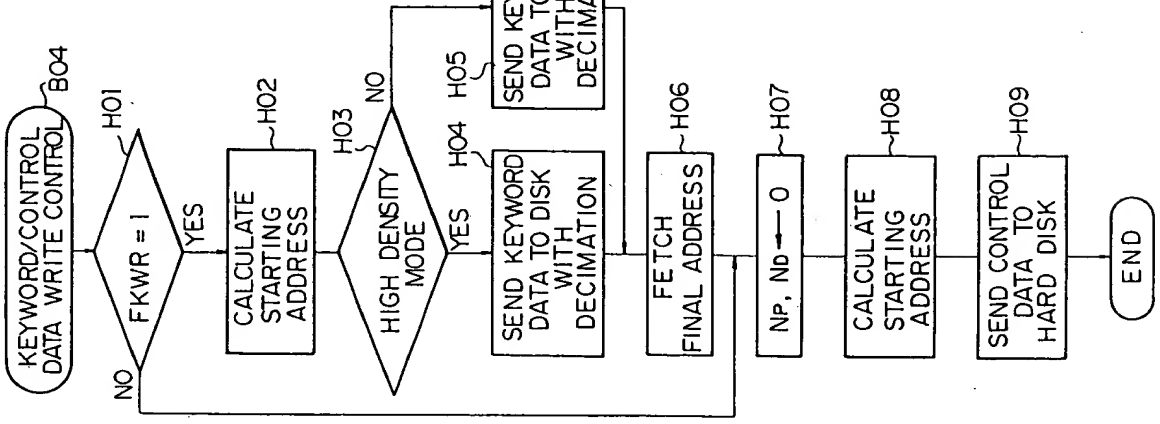


FIG. 16A

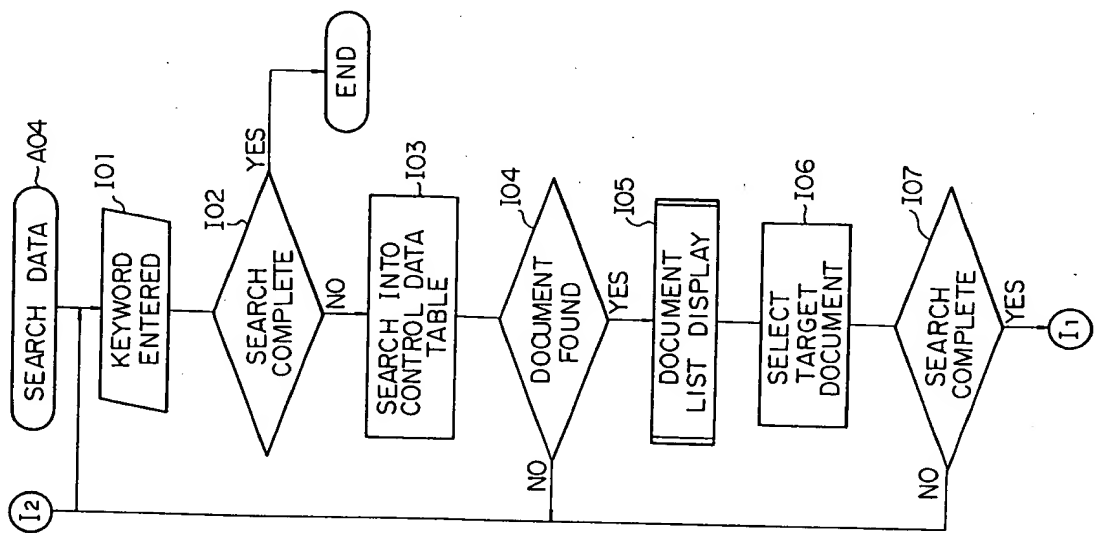


FIG. 16B

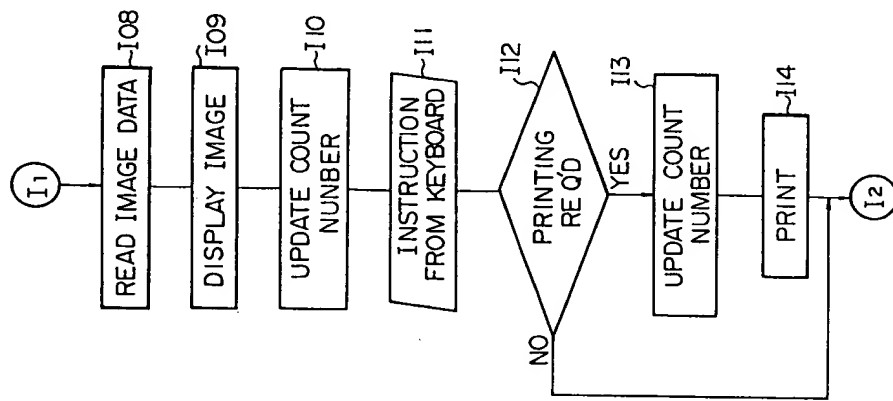


FIG.17A

KEYWORD '1'	
KEYWORD '2'	
KEYWORD '3'	
KEYWORD '4'	
KEYWORD '5'	
RETRIEVE	
END	

ENTER KEYWORD FOR SEARCH

FIG.17B

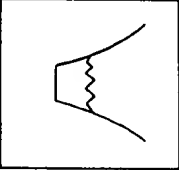
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	
PRINT	RE-RETRIEVE

FIG.18

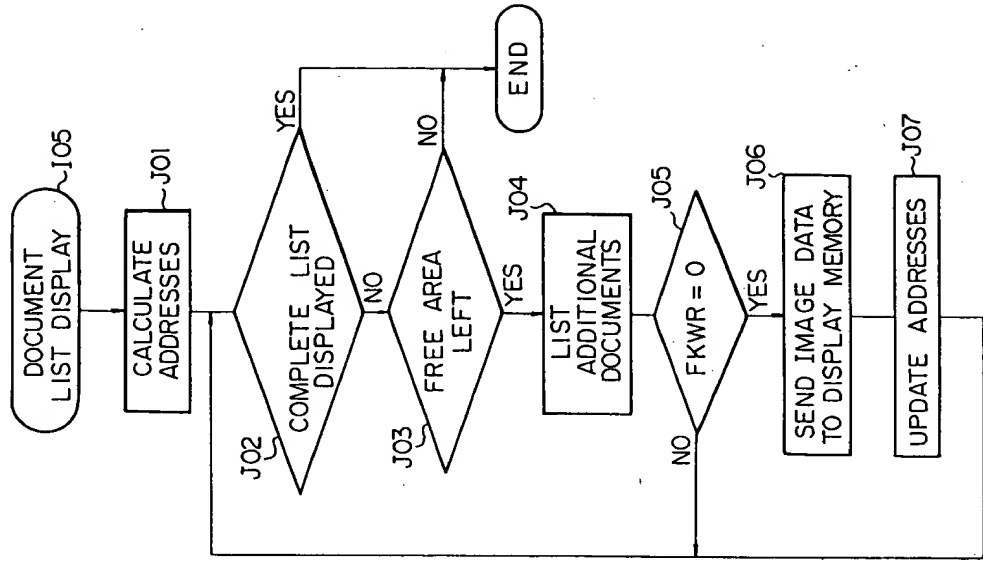


FIG.19

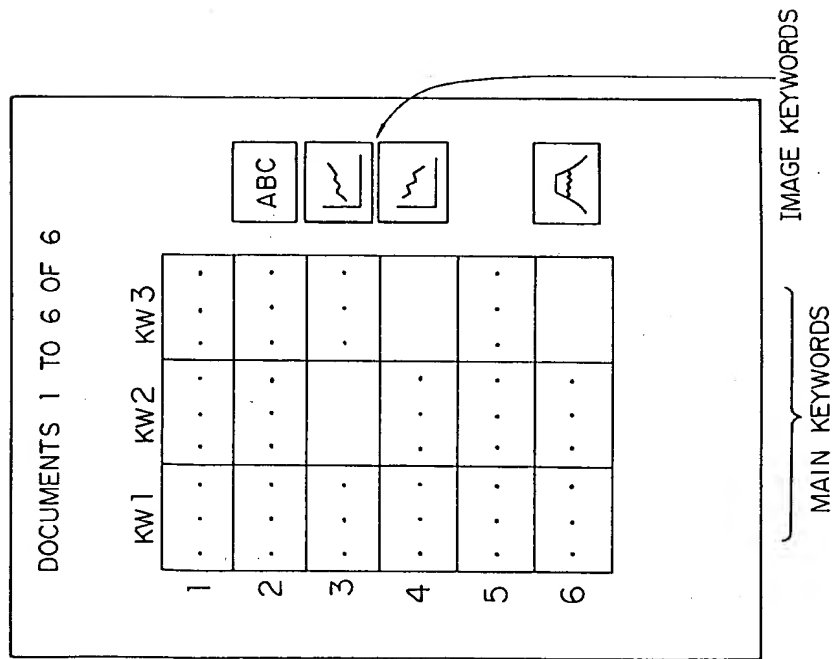


FIG.20

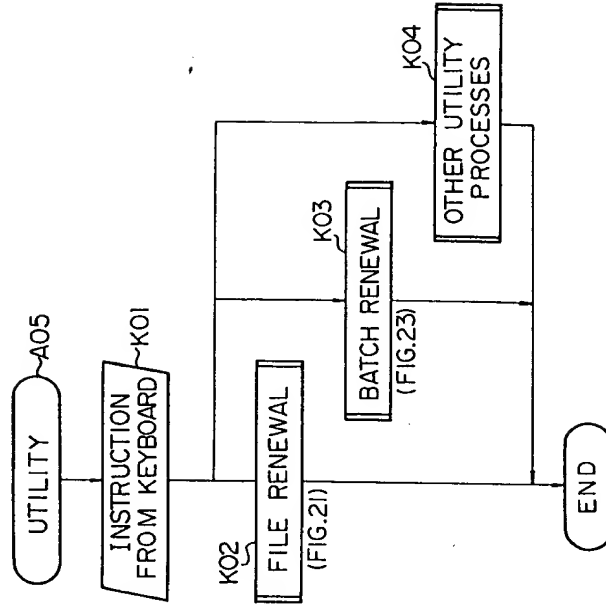


FIG.21A

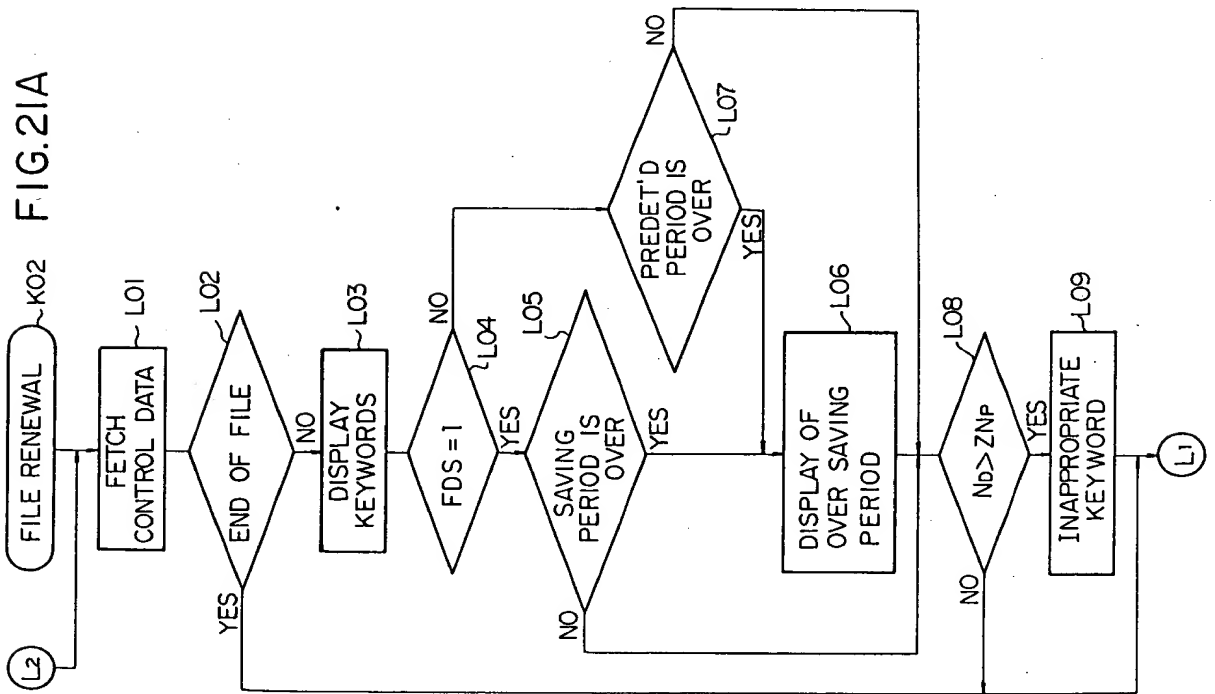


FIG.21B

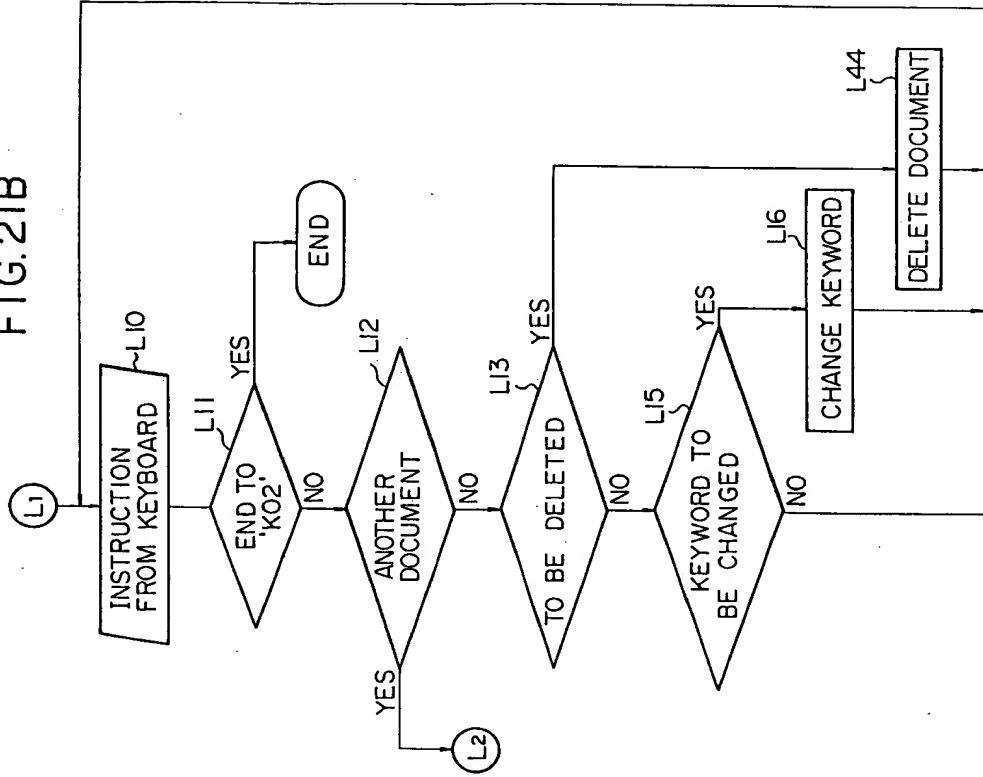


FIG.22

KEYWORD '1'	. . . . .
KEYWORD '2'	. . . . .
KEYWORD '3'	. . . . .
KEYWORD '4'	. . . . .
KEYWORD '5'	. . . . .
DISPLAY: XX TIMES PRINTED: XX TIMES KEYWORD INAPPROPRIATE SAVING PERIOD IS OVER	
DELETE CHANGE	ANOTHER DOCUMENT
	END

FIG.23

